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REPORT

ON THE

SUPPLY OF WATER, **DRAINAGE AND IMPROVEMENT**

OF THE

CITY OF OTTAWA.

BY GEORGE H. PERRY, C. E.,

VICE-PRESIDENT ASSOCIATION OF PROVINCIAL LAND SURVEYORS AND
INSTITUTE OF CIVIL ENGINEERS OF CANADA.

OTTAWA CITY:

PRINTED AT THE "TRIBUNE" BOOK PRINTING ESTABLISHMENT.

1861.

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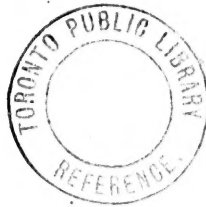
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Sir,

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ENGINEER'S OFFICE,

OTTAWA, May 10, 1861.

SIR,

I have to hand you the accompanying Report on the Drainage, Macadamization, and Water Supply of the City.

From the necessarily large amount of figures involved, it occupied more time printing than was anticipated. An enumeration of the Plans, Sections and Drawings accompanying this Report, will be found therein.

There are also, copies of four Plans ordered by the Committee, viz.: one Plan of the City by Royal Engineers, date 1831; two ditto, by P. L. S. McDermott, dated 1845 and 1851, and one by J. S. Dennis, P.L.S., dated 1859.

I have the honor to be Sir,

Your obedient servant,

GEORGE H. PERRY, C.E.

JAS. SKEAD, Esq.,

Alderman, &c.,

Chairman of Water Works Committee.

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R E P O R T .

THE Geographical position of the City of Ottawa has fitted it to fulfil the conditions of the high destiny awaiting the capital of the, as yet, undeveloped British American Empire. Situated at the confluence of two of the most important tributaries of the Ottawa River, on a commanding position of that stream, the day is not distant when the commerce of half a continent must be concentrated in the port of this city. The staple trade of the Province already centres there, and the development of the immense manufacturing power and mineral resources of the valley of its noble river can be safely predicated upon as accessories to that importance in commercial affairs it is destined to accomplish, and whose establishment can hardly be called a work of time. The natural beauty and advantages of the site on which the city has been built, attracts alike the attention of the statesman, the soldier, the merchant, the manufacturer, the man of science, as well as the sentimental lover of the picturesque. The City was founded about the year 1827, by the construction of a military necessity—the Rideau Canal—the cause of which this City has been the effect—has no doubt had much to do in its selection as the future capital of British North America.

The City of Ottawa is seated on bold limestone cliffs rising abruptly from the shores of that great River from which its name is derived. Its limits are defined on the East by the river Rideau, to that point at which the line which divides Lots E and F, in Concession C and D, in the Township of Nepean, leaves that river. This line forms its southern boundary, and passes across lot No. 40 in the same Township, to the line dividing it from Lot 39. It then turns northwardly along that

line to the line dividing Concession A and the first Concession, and in Concession A, embracing the whole of the broken Lot No. 39, to the Ottawa River, including all the islands to the southerly end of the Union Bridge. Thence following the course of the Ottawa, in the centre of the channel, to the western branch of the waters of the river Rideau, and thence up stream to the point before named, where the dividing line between E and F leaves the River.

This area, so enclosed, contains 1774·0·14 acres, and the islands 36·0·20 acres, about one-third of which is partially built over.

It was incorporated as a town on the 28th of July, 1847, by Acts 10 and 11 Vic., cap. 43.

It could not be expected that a City which dates its existence from thirty-five years ago, should be in every respect as well prepared to receive the honours awaiting her as the Seat of the Government of the British dependencies in North America, as other cities whose matured age has given them the benefit of greater and more substantial improvement. Still, as a general rule, the advantages enjoyed naturally are such as in a great measure to compensate for the want of those artificial additions which a dense population and a large commerce requires. The increasing demands of the constantly accumulating population, and the necessity existing for preparing the City for the high position it has been selected to occupy, has called for some general and comprehensive measure by which the extent of the improvements needed could be ascertained and their actual cost accurately defined. The first step towards obtaining this necessary knowledge was that of having an actual survey of the City prepared in the most careful and elaborate manner, and this had become the more imperative because no actual plan of the City existed. It is true there were a goodly number of *paper plans* (*i. e.*, lines of projection defining lot boundaries) in existence, but such a topographical plan as was actually necessary to define *things as they are*, had never been made. Well aware of the necessity by previous professional experience, of having

this omission supplied in the year 1859, I addressed a communication to E. McGillivray, Esq., the Mayor of this City, pointing out what I thought should be done in a matter of this importance. As it was late in the season, (towards the close of September,) I did not press the matter on the Council, because it was not a proper time to commence a survey of the description required. Although the subject was brought before the Council several times, no action was taken thereon till the month of August, 1860, when a contract for a survey of the City with a view to its Drainage, Macadamization, and a Supply of Water, was accorded to me. This survey had been rendered imperatively necessary by an application being made to Parliament for an Act to legalize a survey of a portion of the City, (late Ordnance property) by J. S. Dennis, Esq., P. L. S., of which notice will be taken in the proper place, as well as for the purposes before mentioned. Fully alive to the importance of the great work committed to my charge, and having determined that it should be done to the best of my professional power and ability, I did not wait for the contracts to be signed, but at once proceeded with the preliminary operations. I had decided on a Trigonometrical survey of the City, because it possesses many advantages over any other method, as it reduces the possibility of error to a minimum, and furnishes so many mechanical checks on its Theoretical and Calculated elements, that no idea of an error of any consequence could be entertained. The City supplies twenty-five Trigonometrical points, and the shores of the north side of the Ottawa River and islands in the same, fourteen, making a total of thirty-nine stations, a series of eight observations on the average at each station, from which every point in sight was taken, furnished a mass of data from which the frame-work of Triangles for field use and proof were constructed, and on which the detail work was based. The extreme accuracy of this method may be illustrated by stating that the greatest difference between the calculated distance and that actually measured never exceeded a decimal of one-tenth of one foot in two thousand feet, and the calculations carried through the whole series of Triangles from West by North-east and South, to the same line again, would close to the same decimal.

This network of Triangles formed, as before stated, the base of operations on which the details were founded, and the position of those details were ascertained by actual measurement of lines run between points on the various lines connecting each Trigonometrical station, thus necessitating the measurement of those lines and compelling an actual check to be placed on the calculated distances. C.T. lines, so chained, the positions of houses and all other details, were fixed also by actual measurement, and that operation has been performed on every Structure, Fence, House or Lot, in the City, as it stood up to 1st November, 1860. The true position of all details having been ascertained, lines of Levels were run through all the streets then open, and contour lines, beginning at the highest point of the hill immediately to North of the Episcopal Cemetery, along the edge of the Rideau River, to that point at which the City boundary leaves it on the South, to the head of the Bay at the Chaudiere. The survey was then laid down on a scale of 66 feet to one inch, and it covers 300 square feet of drawing paper. The sections of the streets cover 560 square feet of the same material, and have numbers representing the heights marked on all the ordinates.

The plans would have been finished at an earlier date, but a portion of surface contained between high and low water, at the foot of the cliffs, of the utmost importance to the City at a future day, as furnishing sites for wharves, etc., could not be accurately got at till a few days ago.

The datum for all the sections is the sill of the lowest lock (guard lock) on the Rideau Canal, and the records of the rise and fall of the waters in the Ottawa River, which has been kept for a series of years by the officers of the Ordnance Department, will be available for determining actual high and low water.

OBJECTS WHICH THE SURVEY HAS ACCOMPLISHED.

The very accurate Topographical survey of the City now laid before you demonstrates the necessity which existed for a measure of this description. A glance at it will suffice to point out the difference between the actual alignment of the streets and the

theoretical straight lines so prominent on all hitherto existing plans, while the disposition of the houses and structures shows a departure from the principles on which the streets are supposed to have been originally projected. In many cases the actual encroachment of houses and fences on the streets is plainly visible, but till this survey was completed, no remedy could be either devised or carried into effect.

Through the kindness of Colonel Coffin, I have been able to comply with the direction of the Water Works Committee, and have copied a plan placed at my disposal by that gentleman, made by J. S. Dennis, P.L.S., and sought to be legalized during the present session of Parliament.

I would recommend that measures be taken by the Council to establish the alignment of the streets, by, in the first place, having the survey now submitted legalized, and, secondly, by having proper boundary marks of *cast iron* placed at the intersection of every street, to the lines between which, the front of all houses should in future be restricted, and not even as much as a moulding should be allowed to project beyond. In the meantime, it would be advisable to allow such frame or other wooden houses as are now on the street to remain till removed by decay or otherwise. This, of course, only applies to cases where the houses are only three or four feet over the line and where the encroachment has not been recent. In placing the cast-iron boundary marks, they should be located on the outer edge of the sidewalk so as to be alike free from the obstruction of projecting house fronts and from the danger of being built over. In comparing the results of our survey with that made by Mr. Dennis, a deviation of some feet is apparent at the lower end of Cumberland Street, commencing on the West side of that street at the junction of St. Patrick's Street and running to the intersection of Cathcart Street.

Taking all the circumstances of the case into consideration, I am of opinion that the interests of the City will be best served by having a consultation between parties selected to act for the Corporation and the Crown Lands Department, or whomsoever they may delegate, for the purpose of settling the

alignment of the streets, and that the lines so determined on may be legalized; at the same time, such questions affecting private property as may be involved therein, can be quietly settled. But the great problem which this survey has solved, is that affecting those improvements demanded by the altered circumstances of the City. Foremost amongst them is the primary one on which they must be based—

THE DRAINAGE OF THE CITY.

Ottawa may be described as situated on bold limestone cliffs sloping towards the Eastward, till, at a point where King Street intersects Rideau Street, it attains its maximum of depression, at an elevation of 70 feet above low water in the Ottawa River. It ascends from that point to the summit of the ridge of sand hills immediately overhanging the Rideau River, when it attains a maximum elevation of 114 feet above low water. It will thus be seen that the axis of depression takes the line of King Street, and governs the natural drainage of the whole City. The true principle involved in the consideration of the plan by which such an extensive system of drainage compelling the construction of expensive works, should be conducted, is that of making all the natural resources of the surface contour available. - In pursuance of this purpose I would recommend the adoption of the natural depression mentioned as the best site for the main sewer of that system of drains which must pervade the City. Starting from a point on Hugh Street, 200 feet, to the south of the present Crown Timber Office, the direction of the main sewer will follow the line of Albert Street to the Basin at the Rideau Canal, under the bottom of which it passes at a sufficient depth for security, and following the course of the present By-wash down Mosgrove Street to its junction with Rideau Street, thence to the junction of King Street, along that street to the foot of Cathcart Street, and up that street to the intersection of Dalhousie Street, the line of which latter street it follows, crossing McKay Street and through the grounds of John McKinnon, Esq., to the final outlet into the Ottawa. Into this main sewer

the whole drainage of the City will be passed, except that portion to the westward of the Concession line between B and C, Wellington Street, and the area between it and the River, together with the district known as Le Breton's Flats, those portions finding their natural outlet through the ravine at the latter place.

The superficial area on which the City of Ottawa stands is equal to 1829·0·19 acres, divided into five Wards, namely :

| | | |
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| Ottawa Ward contains, | 228·1·32 | acres. |
| By Ward do., | 202·0·35 | " |
| St. George's Ward contains, | 484·1·25 | " |
| Wellington Ward do., | 652·2·03 | " |
| Victoria Ward do., | 261·2·14 | " |

There is thus a total area of 1810·0·34 acres and 18·3·25 of water within the City Limits, from which the natural drainage has to be conducted ; and if to this is added the sewage furnished by a population of 90,500 souls, or at the rate of 50 persons to the acre, we have a total quantity of 430,925,282 cubic feet per annum, equal to nearly 819 per minute, to pass through the artificial outlets which must be provided to meet the exigencies of the case.

The method usually pursued in providing for similar contingencies is to assume that the rain fall over the whole area is equal to 39 inches per annum, and of this quantity 24 inches has to be disposed of as superfluous, the remaining 15 inches being (as ordinarily assumed) disposed of by evaporation. This rule is not of universal application, nor can it hold good amidst a dense population, simply because the area of *Pondage* is diminished, and therefore while two feet may be the average contribution of rural districts to the rivers and streams, that furnished by cities and towns must more nearly approach three feet. In well drained cities, very little is absorbed by evaporation, and the true rule which should be adopted is to adjust the area of the sewers to dispose of the whole quantity, plus the sewerage contribution of the whole population, and in addition, to provide for contingencies

arising from sudden discharges owing to atmospheric aberation. In considering this subject, I have supposed that such a circumstance would occur as a rain fall of two inches in 24 hours, and have adapted the sewers so as to accommodate that quantity as fast as delivered. The main sewers as described, will be of the lengths and dimensions as follows: From Hugh Street to Basin 2,900 feet; Basin to Lock on Bywash, 845 feet; Lock to Rideau Street, 500 feet; Rideau to intersection of King Street, 1,900 feet; equal to 6,145 feet, with an average outfall of 35.23 feet per mile. The area drained by this portion of the sewer equals 893.052 acres, and with the population as assumed (50 souls to an acre), the sewerage would equal 155 feet per minute, while the natural drainage would be 237 feet per minute. The dimensions of this part of the main drain $2'6'' \times 3'6''$ will discharge with a depth in the drain of $2'3'' = 1536$ cubic feet per minute. For the proposed length of main, the accompanying sketch, plan No. 1, will show the design.

From the point where King Street intersects Rideau Street, to the foot of Cathcart Street, a distance of 2,680 feet, an enlargement of the sectional area is requisite. Because the rate of fall per mile is reduced, while the superficial area is increased to 1180.307 acres, the outfall being only equal to 14.43 ft. per mile. The section of this drain shews an area of 3.6×5.0 , and with a depth of 2.6 head in drain, the discharge is equal to 2352.35 cubic feet per minute. The sewerage due to the population is equal to 205 cubic feet per minute, and area 293 cubic feet, equal to 498 cubic feet per minute. Sketch plan No. 2 gives the design for this portion of the main sewer.

From the intersection of Cathcart and Dalhousie Streets, the main sewer, to its final embouchure at low water in the river, has a total length of 3,217 feet. The average outfall is 14 feet per mile, the capacity of the main drain has been enlarged to $4'0'' \times 5'6''$, as the superficial area has also considerably increased, the drainage from an area of 1322.111 acres, and sewerage from corresponding population, equals a gross amount of 787 cubic feet per minute.

From the cliffs below Mr. McKinnon's house to a point below low water mark, it will be necessary to build the sewer down an incline of 40 feet in 100, and as the discharge of sewage from so large a population must necessarily be offensive, it will be requisite to construct that part of the sewer with especial care; it should be set in cement, and carried down to a point below the surface of low water.

One of the great objects gained by delivering the sewerage of the City at the point indicated, will be that of having it carried away at once by the current; the evil arising from allowing it to gyrate for weeks in the various eddies sure to be encountered at any other point are avoided, and in a sanitary point of view, the importance of removing the filth of a large city cannot be over-rated.

The capacity of the last portion of the main drain will be equal to the discharge of 3071.20 cubic feet per minute.

The rain fall due to the whole area to be drained, would only reach 356 cubic feet per minute, while a population of 65,000 souls, at an average of 30 gallons sewerage matter per head per day, would furnish 431 cubic feet, making a total of 787 cubic feet per minute, or $\frac{1}{4}$ the capacity of the sewer.

STREET DRAINAGE.

The main sewer forming the natural axis of the surface drainage, the leading street drains are lateral to it, consequently the greatest length attained by any of these drains will not much exceed 3,000 feet, all the parallel streets will thus have the smaller drains, as the disposition of the surface compels draining in the direction of the greatest outfall, the intersection of the lateral streets cutting up those parallel to King Street, into small blocks. Assuming a length of 4,000 feet as the greatest to be drained continuously, and the width of street 66 feet, and of lots on both sides 99 feet, = 264 feet, which sum multiplied by 4,000, will give an area 1,056,000 square feet area, at 50 souls to the acre, the population would equal 1,210, rain fall of 39 inches would give a discharge of 64

cubic feet per minute ; sewerage at 30 gallons per head per diem, equal $4\frac{1}{2}$ cubic feet per minute, thus giving a total of 11 cubic feet per minute to be disposed of. The dimensions of the longer street drains being equal to 2 feet by 3 feet, with a depth of water equal to 2 feet, will discharge with a fall of 10 feet per mile 599 cubic feet per minute. For the cross drains, a much smaller size will suffice, the dimensions according to drawing, will be 1'.6" \times 2'.4".

The form adopted for the sewers is that commonly known as egg-shaped, because it combines the advantages of great strength and resistance to vertical pressure, as well as allowing the utmost scouring capacity, and consequently preventing the deposit of sediment. It is advisable to build the main sewer in stone to the springing of the upper arch, the bottom and sides of the sewer to that point being composed of single brick, lying as shewn in drawings. The upper arch or crown of the drain being of double brick.

The smaller sewers, street drains, manholes being built of brick set in cement, all the brick work should be set in cement. Gutter drains and house drains should be earthenware pipes, 6 inches in diameter. The gutter drains should be put in at 500 feet apart or to suit the blocks into which the city is divided. The manholes in the main sewer are to be 1,000 feet apart, and should serve as gutter sewers also.

Before closing my observations on this subject of drainage, I would wish to enforce the necessity which exists for one uniform and comprehensive system as necessary to the sanitary condition of an increasing population, as it is imperatively demanded for the success and preservation of the works requisite to insure commercial intercourse.

The drainage of that part of the City known as the Lower Town is naturally defective, and the attempts which have been made to improve it are failures, because no proper outfall has been established for the desultory and ineffective measures undertaken. For the upper portion of this division of the City, an out-

fall might be had by draining into the Rideau River, but all eastward of Dalhousie Street is under the influence of that stream at high water, and drainage to any beneficial extent could not be secured. The condition of the Rideau River itself is such as to ignore the idea of any attempted drainage in that direction, which could only result in converting it into an immense cess-pool. As the portion of the City lying along that river is little better than a swamp, and northward of Rideau Street it is the most densely populated portion of the City, the condition of its inhabitants can be surmised, but it requires actual experience to appreciate the discomfort endured in wet weather from its almost unknown depth of mud, and the effluvia arising from its frequent stagnant pools of water. The fearful prevalence of the smallpox during the last season is one of the many evils of a similar description due as much to the unhealthiness of a locality without efficient drainage, as to the epidemical character of the disease. The funds of the Corporation have been wasted from time to time in desultory efforts at drainage, ridiculous in design, and totally inapplicable to the purposes intended, as well as utterly useless in the prospects of any general system hereafter to be adopted. So absurd is the manner in which the drains hitherto constructed in this city, have been designed and built, that a system of *open sewers* would be far preferable for all useful purposes. It could only arise from gross ignorance of the effects produced by the concentration of the sewerage of a densely populated neighborhood that drains built of loose stone covered with cedar, and without sufficient outfall would be allowed to be constructed at all, as the inevitable result must have been to destroy the cellarage of the City in a little while, and to convert the houses into receptacles for the worst kind of miasmas. In addition, the designs for those drains are the worst possible, a rectangular form being best adapted for silting up by the deposit of the heavier material held in suspension by the sewerage water, and it is only stating a well-known fact to assert that nearly all those drains at present constructed are now silting up to a considerable extent. The conclusion which must be forced on the public mind is that a general system of drainage must be adopted; that the first step in that di-

rection must be taken by constructing a main sewer, and that it will be more economical to undertake those improvements demanded by the altered condition of this City simultaneously, so that the laying of the pipes for water supply can be accomplished while the sewerage excavation is refilling, and the surplus being employed to grade the streets, the macadamization may be completed immediately after.

STREET PAVING AND MACADAMIZATION.

The next subject for consideration will be the Improvement of the Streets and Highways of the City. It is a well known rule that good roads are as necessary to trade and commerce as good markets, and it might be added that one of these conditions generally makes the other. At the basis of any system of street improvement, the thorough drainage must lie, because it is ridiculous to witness the efforts made to macadamize in what is literally a sea of mud, and the available assets of the Corporation are expended in fruitless endeavours to construct roads through a morass, from the surface of which they disappear the first wet day. The condition of some of our leading streets is proof positive of this matter. It is a great mistake to suppose that a quantity of broken shale thrown over a thoroughfare is the proper method of construction. It is a mere perversion of terms to call such a proceeding macadamization. This at best is but squandering uselessly funds which judiciously employed would be a beneficial investment for the City. As remarked before, the first operation must be the provision for thorough drainage; the road bed should be then graded and soled. This last operation consists in covering it with stiff clay to a depth of three inches; over that a layer of small boulders from three to five inches in diameter, should be placed, and the broken stone for macadamization to a depth of eighteen inches in the centre, sloping to twelve inches at the gutter, should be laid. The road bed should be cast higher in the centre, at the rate of twelve inches in fifty feet, so as to allow a slope for the surface water to run off freely. Advantage should

be taken of the inclination of the surface to construct the side drains with such an inclination to the nearest gutter drain as to prevent the possibility of overflowing; and the macadamization should follow the contour of the transverse section of the road bed, which outline should be carefully preserved in all subsequent repairs. The material used in construction should be *hard stone*; the limestone of this neighbourhood is too soft and friable, filled with shale, easily disintegrated by atmospheric action, and crushed into plastic mud by a few days' traffic. The Nepean Sandstone appears to be a hard and durable material, and, if of the value asserted in the Commissioners of Public Works' Report, might be rendered available for the required purpose; but I should not like to recommend its use till after fair trial. But the common Syenite or Gneiss is incomparably the best material, and would be the cheapest, because the most durable. Still, macadamization is inadmissible where a large traffic exists, and other methods must be resorted to. The experience of all cities is against the adoption of macadamization as applied to great leading thoroughfares, and efforts have been made in many places to find a substitute in Asphalt, Wood Paving, Brick, and even Cast Iron, as a remedy for the inconvenience arising from clouds of dust or unlimited quantities of fine mud. After fair and sufficient trial, each of those experiments were discarded in turn as failures, and the common stone block pavements of those road-makers of the ancient world—the old Romans—resorted to as the nearest approach to perfection, thus illustrating the sage observation of the wise king, that “there is nothing new under the sun.” The method followed by the ancient conquerors of the civilized world, after a lapse of two thousand years, commands our admiration, because they appear to have viewed their Public Works as being built for the benefit of their successors, and therefore took every precaution to make them as imperishable as the material of which they were constructed. The use of wheel carriages not being as extensive as in our day, there was no necessity for observing the rules which govern modern road-making in so far as the inclination was concerned; but great care was observed in the construction. Although the grades might be inadmissible, still the structure

was without fault. It was in all respects a raised causeway, regularly graded, the bottom of the road bed formed of boulders varying from six to eight inches in diameter; over this was laid a bed of concrete, in which the rough blocks were firmly embedded. At this day, when portions of roads so constructed have to be removed for railway cuttings, the only method available is blasting, precisely in the same manner as of rock *in situ*, and portions of it come away, or are displaced, which must again be drilled and blasted before they are manageable.—Modern practice in this matter of formation, has been modified for two reasons:—In the first place, the expense of setting in concrete would be very great; secondly, because the extensive use of wheel carriages, the consequent economy of animal power allowing heavier loads than the ancients ever dreamed of, by the limitation to easy rates of inclination, involve an amount of wear and degradation by actual mechanical means, which the ancient roads had not to encounter, and compelling the comparatively frequent renewal of the modern ones. Those reasons rendered it necessary to substitute for the concrete some less adhesive material, so that the repairs needed might be accomplished without interfering with the integrity of the whole surface, and at the same time an efficient road bed in which the blocks would sit firmly, could be obtained. The usual method of building such roads at present is to place over the clay soling six inches of coarse sand, and on this to lay blocks of stone one foot in depth at least, and of as regular a shape as possible. In some cities those blocks are usually cut to a perfect cube of one foot; but my own experience does not lead to the conclusion that such a course is at all necessary. My specification for the construction of such a roadway would run thus: “The road bed to be regularly formed as usual with an inclination from the centre, of one foot in 25, soling of three inches in stiff clay, smoothly and fairly laid, six inches of coarse gravel spread over the soling, and the stone blocks to be evenly and neatly laid in same; one row through the centre of the width to be paved, to be laid first—the outer rows on each side, next laid, so as to act as curb stones, and the remainder of the block to be laid

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"between, beginning from the centre and each side, so as to leave one row as keystones. Care should be taken to keep the upper surface as close to the sectional contour as possible, and the true grade of the road on Longitudinal section, should be preserved." The superficial area of such blocks should not be greater than two feet square, larger stones being liable to get out of position and to injure the general structure.

I would recommend that from Union Bridge, through Duke, George, Wellington, and Rideau Streets to Rideau Bridge, this style of road making be adopted for a width of 20 feet in the centre of the road, as shewn in drawing No. 7. From the intersection of Sussex Street, to foot of Bridge at New Edinburgh, a similar construction is desirable. The remainder of those streets should be macadamized with broken gneiss, and good gutters formed at the sides. The cost involved in this measure, although necessarily great, will not be useless, because a roadway properly constructed after the proposed design, will last for many years, and will only require partial repairs. The difference of cost between it and the miserable attempt at macadamization resorted to at present, is so small as to make it a matter of very little importance in the consideration of this subject. I would propose that the remainder of the thoroughfares of the City should be macadamized with broken gneiss; but in no case should the native limestone be used. The construction of gutters as shown on Section No. 10, is necessary; they should be formed of stones set edgewise. Curb stone, next street, should be at least 2 feet deep; and great care should be taken in the construction to build the gutter with all the attributes of an inverted arch. I would also recommend that flagged sidewalks be substituted in all the main thoroughfares for the present wooden apologies; and in all others, that grave' sidewalks be built, as shown in drawing No. 10. Those walks should be formed in the usual way of preparing a macadamized road: the bottom should be composed of boulders to a depth of six inches, over this coarse gravel should be placed and levelled, while the whole should be *blinded* with fine sand. At the outer edge a heavy curb-stone should be placed, on edge of not less than two feet in depth by eight inches in width. The

sidewalk should have a surface inclination towards the gutter of six inches in twelve feet. The cost will not be much greater than the present nuisances, and the advantages in comfort and a sanitary point of view, beyond all comparison. The great objects to be attained by a comprehensive measure of this description, are cleanliness, facility for traffic, and positive freedom from the calamities of annual epidemics, and with a proper supply of water, comparative immunity from fire.

The plans proposed for effecting those objects are in accordance with the natural facilities afforded by the situation of the City, and therefore at the minimum of cost the disposition of the main sewer enables three-fourths of its length to be constantly flushed by the waste of the Canal; and the By-wash, instead of being a source of disease and a nuisance to the low-lying portions of the City, will be made available as a medium of cleanliness. The smaller sectional area of the main drain westward of the Canal, its great outfall, and the facilities which it affords for ordinary flushing operations, renders the consideration of artificial means to that end of only secondary importance. The Longitudinal sections of the streets will show that every advantage has been taken of the natural surface to prevent expensive excavation, and the best and most effective system of macadamization has been recommended as in the end the most economical.

I look upon the opening of Wellington Street and the erection of a new bridge as a substitute for the existing one, (known as Sappers Bridge) to be absolutely necessary. This would involve a large amount of excavation from the end of Elgin Street to the foot of the new bridge, and would necessitate the levelling of the whole area between Wellington and Sparks Street, at the point of junction. This Bridge should have sixty feet of width between the roadways, and according to sketch shown in No. 9, should be one hundred feet span. It should be an Iron Lattice Bridge with Stone Abutments and Wing Walls.—Sketch No. 11 shows the plan proposed to adapt it to Sparks and Wellington Streets. I would also advise the erection of a new Bridge, according to design in sketch

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No. 8, across the Rideau at the foot of Rideau Street.—
Instead of passing on the site of the present Bridge, it would
be advisable to pass the new structure over the foot of the
Island, and elevate it considerably: it should be of three spans of
180 feet each. I would also recommend a similar Bridge to be
erected at the foot of St. Andrew's Street, passing on to the
large Island in the Rideau, and across that to the Eastern
channel, over which a single span will carry it to the eastern
shore. The erection of the Bridge at the foot of Rideau Street
will involve some excavation on the end of that street, which is
provided for in the estimates, and will have the effect of lessening
the ascent. The reason for the bridge at Park Street is to
allow ready access to the Wharf and Railway Station. It is a
mistaken notion to suppose that confining the traffic of a county
to a certain street in its market town is necessarily the best
means of extending or rendering such traffic beneficial to the
interests of all concerned.

The Report on Water Supply for the City has been prepared
for some time, but from causes beyond my control, has not been
submitted to the Council. It is now incorporated in this general
measure, because it is in reality a part of it, and the construction
of the necessary works can be effected more economical'y in
conjunction than separately. One very heavy item of expense in
laying the water pipes (viz., the cost of excavation,) can be
altogether avoided by laying them during the progress of the
drainage. I have to direct the attention of the Council to the
fact that no answer to the application to the Government for the
location of the Reservoir on Barrack Hill has been received,
although three months have elapsed since the date of such
application. It would be advisable that the Council take
immediate action in this matter, and also in procuring a grant of
the reserved lots West of Pooley's Bridge, as the site of the
proposed Water Works.

SUPPLY OF WATER.

The last, but not the least, of those measures demanded for the health, convenience, and comfort, of the inhabitants, and by the altered circumstances and prospects of this City, is the supply of a sufficient quantity of water for all purposes of domestic economy, cleanliness, ornament, or as an agent in the preservation of property from the ravages of fire.—The consideration of the means whereby this want could be supplied has been deferred till now, because, without a thoroughly efficient system of Drainage, an abundant supply of water would be a mistake of the first magnitude, having the effect of converting a morass into a quagmire, and adding largely to the natural evils which affect the low-lying portions of the City. But while the consideration of the means whereby this desirable object could be attained, has naturally followed the more immediately important measure of Drainage, it does not necessarily postpone the execution of the requisite works when the time arrives for putting the whole plan into actual operation. As intimated before, all those works should be carried on simultaneously, as well from their actual connection as parts of the same system as from motives of economy, because by so doing the saving of at least \$70,000 will be effected in excavation for laying the water pipes.

The position of the City of Ottawa naturally confines the consideration of a water supply within the limits of the simple application of natural motive power for that end. Seated on bold limestone cliffs, commanding the plains to the East and South, separated from the West and North by a large River, the question of a supply by gravitation—if the means existed for such a measure—would present features of no ordinary difficulty. But the very reasons which militate against the application of the best and simplest of all powers for ministering to the necessities of mankind in this particular, enables the desired end to be attained by the application of machinery.

The City of Ottawa is founded on a delta formed by the junction of the Rideau River, the River Ottawa, and the boundary line which joins both Rivers on the south side of the City, defining its limits, thus forming a scalene Triangle, of which the longest side is that bounded by the Ottawa River. A short distance below the point at which the Southern boundary of the City leaves that River, its volume is precipitated over a limestone ledge, forming the cele-

brated and beautiful Chaudiere Falls, which furnishes an inexhaustible supply of motive power, as well as abundance of pure water.

The Rideau River occupies the apex of the Triangle on which the City is built. It comes from the southward and dashes over the cliffs from a height of 50 feet, to its junction with the main river. It forms at this point a most magnificent cascade, strongly resembling at a distance a beautiful white curtain: hence its name. Its waters—derived from numberless marshes and swamps, subject to frequent freshets from a clay surface highly charged with decomposed vegetable substances—is totally unfit for storage or distribution to supply the wants of a large population. It is also insignificant in volume, and its motive power within reasonable distance is absorbed by manufactories. In the consideration of a subject of such magnitude as the supply of water to an increasing population, four elements are necessary to the success of the measure—Practicability, Quality, Quantity, and Cost. From the peculiar circumstances of this case, the question of practicability is reduced to the very simple one of applying the motive power furnished by the Chaudiere Falls to the purpose of pumping the water supplied by the River to a Reservoir for distribution.

The difference of level between the lowest water above the Falls and the same pitch below, is about 40 feet, while the same difference between the level of extreme high water at both places is reduced to 24 feet; in other words, extreme high water above the Falls rises to a height of 8 feet above the lowest summer level—below it, to a height of 24 feet. This singular difference is due to the width of the River being reduced from over 14 miles to 2600 feet, and also from the vast volume of water passed into this comparatively narrow channel by the Gatineau, Rideau, Blanche, La Lievre, and North and South Nation Rivers, as well as the closing of the Chenaux Cartier, at Hawkesbury.

It is evident, then, that an immense amount of motive power is concentrated at the Chaudiere Falls, and its application to the desired purposes is one of mere mechanical skill and detail.

The range of cliffs on which Ottawa is founded leaves the waters of that river at the head of Wellington Street, turning sharply to the south, and continuing marked and distinct to the point at which they are crossed by the line forming the City limits, between lots 39 and 40. From the foot of these cliffs a large tract intervenes be-

tween them and the river. This is known as Le Breton's Flats, and with the islands adjacent constitute the manufacturing portion of the City. A large portion of this District is under the level of the waters at the head of the Chaudiere, from which it is separated by a ridge of limestone rock of no great elevation, through the eastern end of which the high floods of the Ottawa occasionally find their way to the lower level.

Indeed, this ridge is hardly 15 feet above the low water level of the Ottawa at the Bay, and gives additional proofs that before the limestone ledge which forms the Chaudiere Falls was degraded to its present height, the river flowed over the whole of the Flats. From the head of the Bay, where the Concession Line B and C now touches the water, a ravine extends up to the foot of the cliffs at Pooley's Bridge, covered at high water to a depth of 10 or 11 feet; and its course to the extreme east corner of the Bay at the head of the falls is clearly defined. During occasional floods, the waters of the Ottawa find their way through this ravine, but in no great volume.

The course of the Ravine from the head of the Bay is nearly south. It turns sharply at right-angles, to the Eastward, before it reaches Pooley's Bridge, and again assumes a southerly direction to the Bay at the head of the Chaudiere. It is with its eastern Traverse we have to do, as between its southern bank and the junction of Duke and Queen Streets an open space reserved by Government for public purposes, furnishes an admirable site for the erection of the buildings and machinery necessary to make the natural motive power supplied by the river available. An excavation of 2000 feet in length through Queen Street to the foot of the Bay at head of the Chaudiere falls, forming at once a mill lead and conduit for supply will enable advantage to be taken of the actual fall necessary for motive power, without fear of back water or any of these contingencies which might arise from the peculiar character of the river. At the same time, this disposition obviates the necessity for excavating a tailrace by using that portion of the Ravine lying between Pooley's Bridge and the lower Bay for a purpose to which it is especially adapted.

A further consideration of the question of practicability resolves itself into the application of the necessary machinery and pumping apparatus to the motive power, and the location of a reservoir for storage purposes. Having provided for the necessary motor, the

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question of lifting the supply of water to the requisite height resolves itself into one of simple Mechanics. I propose to erect two vertical iron water wheels, of 20 feet diameter, working on the gravitation principle, and 15 feet in width; four pumps, of four feet stroke each, with the necessary connections, air vessels, &c., and a rising main pipe of 18 inches diameter, leading to a reservoir placed at or near the site of the Military Hospital on Barrack Hill. The length of this main will be about 3,600 feet. The reservoir should be a parallelogram 250 feet by 200 feet, of a depth of 30 feet; and in its construction the only real difficulty in carrying out this portion of the general design will be encountered. As before stated, Ottawa is seated on cliffs of Trenton limestone—unfortunately not on the superior beds, but on the lower strata of that formation; and, as is well known, from upheaval or other disturbances, such beds are broken, and traversed by fissures of every description, as well as filled with alternate layers of soft shale, the chance of finding a perfectly tight and sound bottom for a reservoir is small indeed. It follows as a matter of necessity that such a structure must be carefully constructed in all its parts, not the least important of which must, in this case, be the bottom. It will be necessary, therefore, to excavate over the whole of that area to a depth of at least 10 feet, and regularly build from that depth upwards. As I advise that this reservoir should have 30 feet of water therein, and as that height should stand above the present level of the surface, some idea of the magnitude of the proposed structure can be formed; and when its cost is set down at \$169,173, it is as small a sum as could be predicated upon with any chance of rendering it a serviceable structure for its intended purpose. To elevate a column of water 160 feet high and 18 inches in diameter, will require an engine of 58 horse power. To meet that, we have a pair of water wheels of 20 feet diameter by 15 feet wide, each furnishing 145 horse power—a force capable of elevating the whole contents of the cistern in 24 hours to its proper height. Once placed there the question of distribution is one of mere detail, as its position would dominate by nearly 40 feet all other points in the city. Assuming the size of the reservoir as 250×200 feet, and allowing the gross area to be = 50,000 sq. feet, we have to deduct from its storage capacity the space occupied by its circumscribing walls, which will leave an area of 36,000 sq. feet, at 30 feet depth, equal to a capacity of 1,080,000 cubic feet, or about 7,000,000 gals. As the pumps, when working to their greatest useful effort, should deliver 75 gals. of water each at a

stroke, and as they will make 12 strokes per minute, or 900 gals. delivered per minute, it would require 180 hours to fill the reservoir with a single pump, working a pair, the same object could be attained in less than 80 hours. At a velocity of 90 feet per minute, the power required would be equal to that of 58 horses, reckoning the dynamic unit at 33,000 lbs. each horse power. With a velocity of 5 feet per second, and 16 feet of effective fall, each wheel would be equal to nearly 145 horse power. Having demonstrated the perfect practicability of the projected supply, the next consideration is the quality of the water and its adaptability to domestic purposes. The River Ottawa furnishes an unfailing supply of pure water, unchanged in quality by freshets, and preserving its purity for a long period, deriving its source from and traversing a region of crystalline rocks; it is singularly free from taint by decayed vegetable matter, while the large and extensive lakes it traverses act as natural filters for the deposit of any sediment it may have held in solution. It thus reaches the City so pure that the question of infiltration need not be entertained. Personal experience has demonstrated its palatable and healthy qualities, as well as its thorough applicability to all domestic purposes, while the aid of the chemist enables us to perceive and appreciate the reasons of its superior qualities. In colour it is of a pale yellow amber, and its chemical composition is as follows:

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| Carbonate of Lime, | - | - | - | - | 0.2480 |
| " Magnesia, | - | - | - | - | .6696 |
| Silicia, | - | - | - | - | .2060 |
| Chloride of Potassum, | - | - | - | - | .0160 |
| Sulphate of Potash, | - | - | - | - | .0122 |
| " Soda, | - | - | - | - | .0188 |
| Carbonate of Soda, | - | - | - | - | .0410 |
| Alumina and Oxyde of Iron Traces, | - | - | - | - | |
| Manganese and Phosphorous do., | - | - | - | - | |

0.6116

As none of the sewerage of the City will be discharged into the River above the falls, the water can be taken from the Bay, and with a little precaution, without the intervention of a supply pipe, from the mill-lead at the wheel-house.

The next question for consideration is that of quantity. A supply of 80 gallons per head per diem for a population of 25,000, would equal 750,000 gallons. Allowing 250,000 gallons more for the use of the Parliament Building and for the City, to be employed for purposes of cleanliness or embellishment, we have a total of

1,000,000 (one million) gallons per diem to be supplied, giving the Reservoir a storage capacity for seven days. A single pump will deliver over one and one quarter million gallons in 24 hours, and as there is provision made for four pumps, casualties arising can be provided against and a constant supply kept up. But it is a question deserving the serious attention of the Corporation, whether it would not be advisable to obtain by purchase or otherwise a site for another Reservoir of similar capacity. Such site is available on the Sherwood property. I would earnestly advise the City authorities to obtain the site marked on the accompanying plan, on which the relative positions of the Reservoirs, Wheel-house, Mill-lead, and rising Main, are marked. It would be as well to observe that the proposed working power could be made available to its fullest extent, so that the question of quantity to be supplied is not of any serious consideration: with the power at hand it would be a mere affair of expense.

The last element necessary to the success of this great measure is that of cost, and it cannot be said to be a very heavy matter when the prospective and peculiar position of the City is to be taken into consideration. Its greatest item, as before stated, is the construction of the Reservoir, but that is an unavoidable outlay it would be impossible to dispense with. I have made the calculations on an increase of population to 25,000, and with an additional Reservoir the works will be capable of supplying water to double that number at least. I have estimated what I know to be ample sums for the construction of those works, and I hold tenders from mechanical Engineers in this City who are prepared to contract for the machinery and water pipes at the prices given by me. The advantage of having all the machinery constructed in this City is sufficiently obvious, and should not be overlooked, as it is one of the benefits likely to arise from an extensive measure of this kind, calculated to develop the manufacturing capabilities of this City, and to establish amongst us that mechanical superiority which our material resources demand, and which the progress of events assuredly requires.

The Estimates for the completion of this measure will be found appended, and it behoves the people of this City to see what the actual demand on their resources will be in connection therewith. As before stated, they are amply sufficient to meet the requirements of the design placed before the Council, and are not in excess of the demand. It is a subject of serious consideration for the people of

this City, that it be prepared to take the high position awaiting it, and that no mistaken economy will interfere to prevent the inauguration of measures imperatively demanded by the exigencies of this case. With the example before us of the cities of Great Britain and the continent of Europe, the founders of those new seats of empire on the American continent, have an incitement and a precedent to guide them in adopting a different mode of procedure. Now is the time to establish an efficient system of improvements calculated to promote the comfort and sanitary condition of the people and facilitate the development of the commercial and manufacturing interests of the country.

COST OF CONSTRUCTION, AND DESCRIPTION OF WORKS.

The leading thoroughfare through the City is from Union Bridge to the Bridge over the Rideau River at the foot of Rideau Street. From East end of Suspension Bridge to West end of Bridge over Mill leads and Lumber Slide channels,—a distance of 332 feet,—this street must be paved twenty feet wide in the centre with blocks of gneiss laid on six inches of sand. The remainder of the width, forty-six feet, should be macadamized. The substratum being rock, will not require any of the conditions demanded by other streets; and the situation of this portion of the City being on an island, no necessity exists for taking its drainage into consideration. The length of the Bridge connecting it with Bridge Street, is 480 feet. It is a wooden structure built on stone piers with an average width of 18 feet, and should be replaced by a wider structure; in fact, all those bridges should be 40 to 60 feet wide, but as it is in good repair, it does not seem necessary to include a new structure in the Estimates. From East end of Bridge to junction of Duke and Bridge Street, a distance of 460 feet, with a width of 60 feet, the paving, as described, being 20 feet wide; two flagged sidewalks of 12 feet each; macadamization of 16 feet. Duke Street has a length of 872 feet and a width of 60 feet, to junction of Queen Street; Queen Street from Duke Street to foot of Pooley's Bridge, 220 ft. length, 60 ft. width. Within 32 ft. of the East end of Pooley's Bridge, a house used as a blacksmith's shop appears by the boundaries to be on this street. Pooley's Bridge, a wooden structure 145 feet long and 24 feet wide; it is built on *bents*,

and is in moderately good repair. The roadway is about 30 feet above the bed of the Ravine over which the Bridge crosses. I would advise that this Ravine be filled with the debris coming from the excavation of the cliffs, a culvert of three feet diameter placed in the centre of the Ravine, and the surface levelled southward for 200 feet.

A street called Perkins Street is shown on some of the City maps as running from this point southward to Broad Street, neither of those streets are open, but the line of the Ravine through which Perkins Street runs, is the key of the drainage of the Flats and all that surface contained west of Concession B and C which cannot be effected by the main sewer. The area of this surface will be 348.3.15 acres, discharge from which will be 94 cubic feet per min., and from 17,000 inhabitants, 60 c. f. : total—154 cubic feet. It is proposed to drain through this street into a sewer 2 x 3, and an outfall of ten feet per mile will give its discharging capacity, at a depth of two feet in drains, as 599 cubic feet per minute. This sewer is to reach to the head of the Bay, where a sluice is to be constructed to secure ample flushing power and an embankment drawn across the head of this Ravine.

Immediately adjoining the North East corner of this Bridge, a house has been built within the last three years.—Existing boundaries show this house to be on Queen Street, previous to its junction with George's Street; but it is for the Council to ascertain what authority placed those boundary stones in position, or of what value they may be. As the house now stands, it is a nuisance, simply because it compels a turn at right angles on a steep descent, and must be removed either by purchase or other means, before the thoroughfare can be fairly said to be open. The house stands 65 feet from the end of the Bridge, and it leaves the approach thereto only 62 feet wide. From the Bridge to George Street, a distance of 65 feet—from thence to end of Wellington Street, 785 feet, the average width of the present street is 42 feet, but it must be widened to 66 feet at least. Wellington Street has open length of 3680 feet, measuring from Dr. Hill's house to East side of line of intersection of Elgin Street and from thence to foot of proposed Bridge over

Canal and River 400 feet to be opened. The average width is 96 feet, of which 20 feet is to be paved and 52 feet macadamized. Flagged sidewalks for the whole length are advisable, and I propose to raise the present surface of the street between Bank and Hugh Streets, on the average twelve inches. A similar elevation will be necessary between Metcalfe and Elgin Streets. From the Eastern side of the latter street it is proposed to excavate, as shown on Section No. 1, to head of proposed Bridge, and to adapt that Bridge to suit the traffic between both sides of the City, through Sparks Street and Wellington Street. The grade, as shown on Section, will give an inclination of 6.7 in 100 feet, the length of the structure constituting the Bridge will be 260 feet, and the embankment or filling to foot of present Sappers' Bridge shows an inclination of 5.5 feet in 100.—The cost of this structure, with a Bridge span of 100 feet of Iron, Abutments of stone, Wing Walls, etc., etc., and filling, has been estimated. The total length is 320 feet. The length of Rideau Street from present gate at foot of Sappers' Bridge to end of Rideau St., is 6125 ft.; width 96 ft., and 66 at lower end. Several obstructions occur in this street. On the West side of Nelson St., North of Rideau, at the junction, a portion of the fence of a lot owned by Mr. A. McGibney, appears to be on the street, and from that point the true alignment of the street has been intruded on by houses and fences. It is proposed to pave 20 feet of the width of this street, macadamize 52 feet, and flag sidewalks to junction of King Street. From the end of Rideau Street to present Rideau Bridge, a distance of 460 feet, the roadway must be widened and excavated, as shown in Section No. 1. A new bridge should be thrown across the River at this point, elevated considerably above the level of the present Bridge, so as to reduce the ascent. The cost of this is also estimated. This excavation should extend from the head of the Bridge to Wirttemberg Street, and the rate of inclination should be 4.7" in 100 feet. The present surface should be excavated to an average depth of 2.6' from Cobourg to Gloucester Street, and filled from thence to King Street, an average depth of 18 inches, from that street to Ottawa Street, a filling of the same depth will be required. This is shown on Street Section No. 1.

The cost of all those improvements will be shown in the following details, and I am convinced are amply sufficient for the purpose.

DESCRIPTION OF STREETS TO BE IMPROVED.

Sussex Street.

This street joins Rideau Street nearly at its north-western termination and runs for a distance of 2937 feet in a northerly direction, to a point at which it is intersected by Bolton Street, opposite the site of the Soap Manufactory. Its width is 66 feet, and it is the most westerly of the streets of Lower Town parallel with the anticlinal axis of the City at King Street. As far as its drainage will be concerned, it may be said to be adapted to the purpose of a catchment drain, or rather a series of such drains of small length, its natural outlets being the lateral streets east of King Street. It is the natural highway to what must become the future port of this City, and the Railway Terminus, as a consequence a thoroughfare of great importance, and must be paved and improved as provided for in the Estimates. In connection with this subject of Paving, I would recommend that all street crossings be paved with blocks similar to that recommended for street paving. The sidewalks should be flagged. The plan proposed will not materially interfere with the present level of the streets or its alignment. The proposed sewer will be at an average depth of ten feet below the surface of the street, affording ample drainage, and its dimensions should be 1'6" x 2'6", as shown in drawings, with earthenware pipes of six inches diameter inserted opposite each house and at each gutter trap. Such traps should not be less than 500 feet apart, and should be constructed to suit the climate. The existing grades of this street will not be materially interfered with.

Metcalf Street.

Metcalf Street runs from the north end of Sussex Street in an easterly direction to the Rideau River. Its total length is 2,590 feet and its width 60 feet. At the Eastern end it will require heavy filling, but this operation can be cheaply effected by the spoil of the main sewer which crosses it under Dalhousie Street. It is proposed to pave, macadamize, and flag the sidewalks of this street. From its limited area its drainage will be effected by the small sized sewer. It is hardly built upon, and its principal importance is derived from the Railway Terminus being at present located at its southern

end. It is the second outlet the city possesses in an Easterly direction.

McKay Street.

This street is 870 feet long and 60 feet wide. It joins Metcalfe Street on its Northern side and terminates at the cliffs over the Ottawa River. It appears to be the extreme Northern termination of Lower Town, is not properly opened, and can hardly become of sufficient importance to make it a subject of special care. There is provision for macadamizing and supplying it with gravel sidewalks. Its draining will only require the smaller sewers.

Baird Street.

Baird Street extends from the north end of Carleton Street, in a westerly direction, to the Ottawa River. It is only open to Anglesea Square—a length of 797 feet, with a width of 60. The calculations for macadamizing and improving this street will be found in the proper place. Its drainage will be effected by the small sewer.

Redpath Street

Extends from the undivided space on the west bank of the Rideau, between King and Carleton Streets, to the south end of Anglesea Square. A house stands nearly in the middle of this street, which must be removed. The length of this street is 1337 feet, width 66 feet. It is contemplated to macadamize and drain it as proposed. For cost, see the estimate. Its small superficial area will only require the small drain.

McTaggart Street.

The Ottawa and Prescott Railway occupies the centre of McTaggart Street. Both sides of this street must be improved. Its width of 66 feet will permit 20 feet of clear space being left to the Railway, which will leave 23 feet to each side of the street available for roadway. Its length from the Bridge to Terminus of Railway on Metcalf Street, is 2080 feet. Its western end towards the river is not opened. The side-walks on this street will be 10 feet wide. There should be a good, substantial post and rail fence placed along the Railway, separating it from the street on each side. As the main drain nearly bisects this street, its sewage will only require one of the smaller drains to discharge it.

Boteler Street.

Boteler Street starts from the west bank of the Rideau, and runs to the cliffs over the Ottawa, intersecting King, Carleton, Dalhousie

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and Metcalf Streets. Its western end, beyond the latter street, is not opened. Its length to Metcalf Street is 2266, with a width of 66 feet. Between Dalhousie and Metcalf Streets a good deal of filling will be required, and can be easily obtained by depositing the spoil from the main sewer where necessary. Provision is made in the estimates for macadamizing and improving this street. Sewerage of the smaller class, as it has the same relation to the main sewer as McTaggart Street.

Bolton Street.

Bolton Street, from the open space on the west bank of the Rideau to its point of intersection at the junction of Sussex and Metcalf Streets, measures 2532 feet in length, by 66 feet in width. It intersects King, Carleton and Dalhousie Streets, and will be improved as proposed in estimates. Its drainage will be effected by the smaller sized sewers.

Cathcart Street,

From the west bank of the Rideau to the point of intersection with Sussex Street, measures 2638 feet, by a width of 66 feet. Its alignment is interfered with by houses being built on the street, as can be seen by reference to plan. Its southern side appears to be the boundary of the late Ordnance property in the city. Provision has been made for the improvement of this street by macadamization. Its drainage will be effected by the main sewer, which passes for 1100 feet along its lower end, and by the smaller sized drains above and below the part where that sewer leaves King Street. This street intersects King, Cumberland, passes along the south end of Cathcart Square, and intersects Dalhousie and Sussex Streets. Its upper end, beyond the latter street, is not open.

Bolton Street.

This is the second street of the same name in this end of the city. It is the first on the late Ordnance property, and extends from King to Sussex Streets—a distance of 2400 feet. Its present width is 62 feet, although it appears to have been originally laid out much wider. There are strong reasons for supposing that the original boundaries of this street have been removed within a very short time, and the alignment of the street altered thereby. It is also alleged that the lot boundaries or lines are also altered; but from whatever cause it has arisen, the alignment of the street—especially on the North side—has not been preserved. If these houses on the south side are built on the original line, the true alignment of the street is preserved on that side; but it is evident on the north side

this is not the case. The boundary stone on the north-west corner of this street has been (as alleged) removed $2\frac{1}{2}$ or 3 feet eastward of its original position, and four feet southward. There is also a house at the north-east corner of this street, at its junction with King Street, which is nearly 10 feet on the street, and also on King Street.

The improvements contemplated in this street are comprised in its macadamization and drainage: for the first a provision is made in the estimates, and for the latter a sewer of 2×3 feet will be amply sufficient.

St. Andrew's Street.

From Sussex street to King street, a distance of 2178 feet, St. Andrew's street, with a main width of 62 feet, is in every respect similar to Bolton street, with the exception that the actual alignment of the street has been preserved. The singular appearance of the block bounded on the south by Rideau street, on the east by King street, on the west by Sussex street, and on the north by Cathcart street, cannot fail to attract attention, as much from the diversity of the widths of the streets as want of uniformity in the dimensions of the lots. The frequent complaints made of changes in boundaries, and the uneasiness felt by the owners of the property thereon, as well as the extraordinary appearance it presents, leads to the conviction that some great blunder had been perpetrated in the original surveys. The only way in which any dispute which may arise from this state of things can be settled is by reference to original plans, if such exist, or by compromise, in which public and private interests will be conserved by mutual concessions.

Provision has been made in the estimates for improving this street by macadamizing it and by draining. This latter object will be effected by a sewer of the dimensions of 2 feet by 3 feet.

Park Street.

Park street is merely a continuation of St. Andrew's street, from King street to the Rideau River. It is 1871 feet in length, with a width of 62 feet. It is to be macadamized, and drained by a sewer 2 feet by 3 feet. I have proposed to erect a bridge from the end of this street to the Island in the Rideau, and make a road over it, with another bridge over the eastern channel—thus adding another outlet to the Lower Town.

Church Street.

Church street, from King street to Sussex street, measures 2188

feet. Its width is 62 feet, and it requires to be macadamized and drained. The necessary provision is made in the estimate. The sewerage will be 2 by 3 feet.

St. Patrick Street.

From its intersection of King street, St. Patrick street measures to Sussex street 2183 feet, with a width of 62 feet. It is similar to all the streets before enumerated in physical aspect, but presents a more densely populated neighborhood. It is generally in a wretched condition, in consequence of the want of drainage—an evil which affects the whole district under consideration. Provision is made in the estimate for the necessary improvements. The drainage will require a sewer of 2 \times 3 feet.

Ottawa Street.

Ottawa street is a prolongation of St. Patrick's street, from King street to the Rideau. Its length is 2820 feet, and width 66 feet. It furnishes presumptive evidence of the conclusion arrived at when describing St. Andrew's street, and induces the suspicion that those streets had been originally laid out at a width of 66 feet. The population on this street is sparse, and it presents all the features of a suburban street. The estimates detail the cost of its improvements. It will require a sewer of 2 \times 3 feet.

Murray Street.

From Sussex to King streets, a distance of 2183 feet, Murray street measures 66 feet in width. It intersects Dalhousie and Cumberland streets, and will not require much surface change. It is to be macadamized and drained. For the latter operation, a sewer 2 feet by 3 will be requisite.

Clarence Street.

Clarence street measures 2183 feet in length, from Sussex street to King street. It is 63 feet wide and will require the usual improvements. Its drainage demands a sewer of 2 \times 3 feet. Parry street is a continuation of this street, and from King street to west side of Anglesea Square is 1363 feet long, and 64½ wide. It will require similar improvements, and a drain 2 \times 3 feet, as it is in a neighborhood of no great elevation above King street.

York Street.

From its junction with Sussex street to King street, York street measures 2180 feet, with a width of 132 feet. It will require the

improvements detailed in estimates, and the capacity of its sewers must be equal to a drain of 2×3 feet.

Some of the lots on the lower end of this street appear to be in a confused state; and it is alleged that they are more complicated by recent surveys.

George's Street.

George's street is 1690 feet in length. It extends from Sussex street to Cumberland street, and has a width of 125 feet. It intersects Dalhousie street, and is disfigured by an Engine House which stands in the centre, opposite Mosgrove street. The waste water of the Rideau Canal is carried down this street in an open channel some 10 or 12 feet wide to Dalhousie street, where it is passed under a bridge and through several lots into York street, near its junction with King street. George street requires a drain of 2 feet by 3 feet for its sewerage.

Dalhousie Street.

From Rideau street to McKay street, Dalhousie measures 4213 feet, with an average width of 58 feet. Its course nearly north and south, and parallel to Sussex street, being situated on the slope of that hill to which Sussex street may be said to act as a catchment drain. The improvement of Dalhousie street is by no means a difficult task, as all the lateral drains between King street and Sussex street have sewers of comparatively large area; and as those streets intersect Dalhousie street, all portions of it south of Cathcart street will only require a drain of 1.6×2.6 feet. North of Cathcart street, the remainder of Dalhousie is occupied with the main sewer.

The contemplated improvement in addition is macadamization.

Cumberland Street.

Cumberland street measures, from Rideau street to Cathcart Square, 2614, with a width of 58 feet. Its general outline is level, as it lies nearly at the foot of that elevation of which Dalhousie street occupies the slope, and Sussex street the crest. Its drainage from Rideau street to York will be effected by a drain of 2×3 feet. From that to its termination at Cathcart Square, drains of 1.6×2.6 feet will be sufficient. It is to be macadamized and improved as provided in the estimates.

King Street.

The anticlinal axis between the cliffs overhanging the Ottawa, and the range of sand hills above the Rideau River, from the western

bank of that river a short distance above the Falls, holds a southerly course to Rideau street. Along the bottom of this valley King street has been laid out; but the range of heights bordering it on the east sweeps around to the westward, and are prolonged till merged in the cliffs overhanging Le Briton's Flats, below the junction of Maria street with Concession B C. King street, from its junction with Rideau street to the banks of the Rideau River, measures 3926 feet, with a width of 132 feet. Its improvements will consist in macadamization and drainage. This last will be effected by the main sewer to the junction of Cathcart street, and from that point by a sewer 1.6×2.6 feet.

This street commands the drainage of the whole city, and particularly that portion of it contained between Rideau street and the delta formed by it and the Rideau and Ottawa Rivers.

The whole of the district within these lines require effective drainage, because the lower and more densely populated portions are without sufficient outfall. It is a curious fact, that the low lying portions of every city are always most densely peopled—as if miasmatic influence possessed attractions which were irresistible.—Whatever may be the cause of this strange anomaly, it is certain that the fact to be dealt with is one of the utmost importance in a sanitary point of view; and that is, the effective drainage and improvement of this part of the city cannot with safety be postponed any longer, and the construction of this main sewer should be undertaken as soon as possible—because every month is adding to the accumulation of filth in and about those low lying districts, and the state of the streets and thoroughfares is a disgrace to any community. No remedy short of thorough and effective drainage will suffice to rectify this state of matters.

Carleton Street.

Carleton street may be said to leave Cumberland street at the junction of Cathcart street, forming with the latter the east and south sides of Cathcart square. Its length to Metcalf street is 1820 feet, with a width of 66 feet. Its improvements consist in macadamization and drainage. For the latter, a drain of 2×3 feet will be required.

St. Paul Street.

St. Paul street extends from the east bank of the Rideau Canal to Nicholas street—a length of 912 feet, by 58 feet in width. It is to be macadamized and drained. The sewer should be $1'6'' \text{ ft.} \times 2'6''$

Besserer Street.

Besserer street, from the east side of Nicholas street to the bluff over the Rideau River, measures 5300 feet in length, by 58 feet in width. It intersects Ottawa, Cumberland, King, Nelson, Gloucester, Chapel, Agusta, Cobourg, Charlotte and Wurtemberg streets. Its natural outfall is towards King street, although from the intersection of that street it is located on a plain at a considerable elevation above it. To grade this street properly there will be a good deal of cutting and filling, which is provided for in the estimates. Its drainage can be effected by sewers of 1.6 x 2.6 feet.

Daly Street.

From Nicholas to bluff over the Rideau, Daly street will measure 4880 feet. From its position on the crest of the plain on which Besserer street is situated, the improvements of Daly street will be much easier effected. It intersects the same streets as Besserer, and its drainage will demand the same sized sewers, 1.6 x 2.6 feet.

Stewart Street.

Stewart street measures, from Ottawa street, 4680 feet to bluff over Rideau. It is 56 feet wide, and in every respect similar to Daly street

Wilbrod Street

Wilbrod street measures, from Ottawa street, 4160 feet; is 58 feet wide, and similar to Stewart street.

Theodore Street.

Theodore street, from junction of Nicholas street and Gloucester Road to bluffs over the Rideau, measures 4440 feet; is 66 feet wide, and similar to Wilbrod street in improvements. The population of these streets are very much scattered, but they cannot fail attracting inhabitants as other parts of the city becomes filled up. The size of sewers for this street will be 1.6 x 2.6.

Gloucester Road.

The Gloucester Road runs from the junction of Nicholas and Theodore streets to the City limits, a length of 2985 feet, with a width of 45 feet. It should be well macadamized, and drained by open water-tables or side-drains running into the ravine at the dam near the City limits. The road bed should be raised at this point, for which provision is made.

Nelson Street.

Nelson street, from Rideau street to Ottawa street, measures 1523 feet; is 58 feet wide, and requires macadamization and drainage.— Its outfall is in direction of Ottawa street, and it is intersected by Parry street. A drain of 1.6 \times 2.6 feet will suffice for this street.

Gloucester Street.

From Rideau to Ottawa streets, a distance of 1526 feet, Gloucester street is 65 feet wide. Its improvements consist in thorough drainage and macadamization. It is governed by the same law that prescribes the size of drains for Nelson street.

Chapel Street, Augusta Street, Cobourg Street, Charlotte Street, and Wurtemberg Street are not yet opened. It is not necessary taking them into account, because they belong to the same general design, and are governed by the same laws as to improvements and drainage outfall. In fact, the cost of a rod of macadamization or drainage in any of these streets east of King street will accurately measure the cost in the next street, and in every street so situated.

Streets South of Rideau.

The peculiarity of surface which makes King street the anticlinal axis of the City of Ottawa where that axis changes at the junction of Rideau street, compels a similar natural division of the streets extending laterally from Rideau street, parallel to and beyond King street, so that the distinction into south of Rideau street may be understood as a natural rather than an arbitrary division, especially when the same streets are named on both sides of that thoroughfare.

From the eastern end of Rideau street to the point at which King street intersects, the natural drainage of the great plain on which the streets parallel to Rideau street are located, is to be found down these streets through the lateral streets. Beginning at the extreme eastern end of Rideau street, we have Augusta street to the south, extending from Theodore street, and intersects Wilbrod, Stewart, Daly and Besserer streets. Its length, 1374; width, 66 feet.— Drainage demands a sewer 2 feet by 3 feet.

Chapel Street.

From Rideau to Theodore streets, length 1372 feet; width 66 feet; requires to be macadamized and drained. Sewers 2 \times 3 feet.

Gloucester Street.

From Rideau to Theodore street, length 1367 feet; width 65 feet; to be macadamized and drained. Sewers 2×3 feet.

Nelson Street.

Length 1372 feet; width 58 feet. Improvements similar in every respect.

King Street.

Length 1374 feet; width 66 feet. Improvements similar.

Cumberland Street.

Length, from Rideau to Theodore street, 1365 feet; width 58 feet. Improvements, macadamization and drainage. Sewers 2×3 feet.

Ottawa Street.

Rideau to Theodore street, the length of Ottawa street would be 1383 feet. Improvements, macadamization and drainage. Sewers to be 2×3 feet.

Nicholas Street.

From Rideau street to junction of Theodore street and Gloucester road, Nicholas street measures 1384 feet, and is 58 feet wide. Improvements, macadamization and drainage. Sewers 2×3 feet.

The excavation or filling for these streets is amply provided for in the estimates.

Mosgrove Street.

Mosgrove street is some 400 feet in length from St. Paul to Rideau streets, and 198 feet to the north of the latter street. It is 60 feet wide, and should be macadamized and drained. Sewers 1.6×2.6 .

Little Sussex Street.

Little Sussex street, from St. Paul street to Rideau street, measures 367 feet in length by 33 feet in width. It should be macadamized and drained. Sewers 1.6×2.6 .

William Street.

From Rideau to George streets 198 feet long, 38 feet wide. Macadamized and drained. Sewers 1.6×2.6 . An extension of this street is desirable, from the north side of George street to the south side of York street.

Sparks Street.

Sparks street, from the Sapper's Bridge to George's street, measures 4158 feet in length, 58 feet wide. Between O'Connor and

Bank streets the grading will require to be raised; and from Bay street to George's street a heavy rock excavation will be necessary to open the street. Both of these measures are provided for in the estimates. As Sparks street occupies the side of a hill, its natural drainage outfall is in the direction of the lateral streets, southward, or towards the upper length of the main sewer. As it will, therefore, be drained through Elgin, Metcalf, O'Connor, Bank, Hugh, Sally and Bay streets, a sewer of the smaller dimensions will suffice for its necessities— 1.6×2.6 .

Queen Street.

The length of Queen street now open is equal to 2962 feet, with a width of 58 feet. It will require considerable improvement. As it is parallel to the main sewer, its drainage will be delivered through the lateral streets intersecting it, and the dimensions of its sewer will be 1.6×2.6 .

Maria Street.

From the east side of Concession B and C, at the junction of the Richmond Road to the limits of the Canal property, a distance of 4960 feet, Maria street is only partially opened. Its width varies from 30 to 66 feet; and as it is parallel to the main sewer, its drainage will be delivered through the lateral streets. This limits its sewer to an area of 1.6×2.6 . Its other improvements consist of macadamization.

Biddy Street.

The length of Biddy street now open from Concession B C to Bank street, is 2458 feet; its width is 35 feet. As the property is not laid out in town lots, its improvements must be confined for the present to macadamization. Its drainage outfall is towards Bank street, and its sewerage will demand a drain 2×3 .

Centre Street.

The length of Centre street now open is 4195, by 35 feet wide. It is in every respect similar to Biddy street, and will require a corresponding system of improvement and drainage.

Elgin Street.

From Wellington to Queen streets, Elgin street measures 530 feet by a width of 56 feet. As it will carry a portion of the drainage of Sparks street, it will be necessary to construct its sewers with a view to that object; and, therefore, from its junction with Sparks street its sewers will be 2×3 .

Metcalfs Street.

This street, from Wellington to Maria streets, measures 1330 feet, by a main width of 60 feet. It will require heavy grading to pass it over the low ground between it and Maria street. Its improvements have been provided for—a large portion of its filling being derived from the spoil of the main drain. Its sewerage—as it will take a portion of Sparks street, and also a portion of that collected at and beyond Maria street—will be equal to a sewer 2×3 .

O'Connor Street

Is in every respect similar to Metcalfs street. Its length is 1320 feet, width 61 feet. Its drainage and general improvements will be similar.

Bank Street.

Extending from the City limits to Wellington street, a distance of 3050 feet, Bank street does not possess a natural outfall for drainage, but an artificial inclination can be had without any extra expense, because its ground surface is comparatively level. It is designed to conduct its drainage into the main sewer; and as it will be the recipient of the drainage of a large area, the size of its sewers will be 2×3 . The northern end will also be of the same dimensions.

There is a remarkable deflexion in the line of this street, commencing at Maria street and extending to Queen street. It will be necessary to widen this street; its present width below Maria street not being over 35 feet.

Hugh Street.

From Wellington to Maria streets, a distance of 1296 feet, Hugh street presents a width of 58 feet. It crosses the head of the main sewer of the City at where Albert street is projected to intersect; and its improvements are simply macadamization and drainage. As it is intended to carry the same area of drainage as other lateral streets, the capacity of its sewers must be of the dimensions of 2×3 .

Sally Street

Extends from Sparks street to Maria street. Its improvements will be macadamization and drainage. Its outfall will be towards the projected line of Albert street, through which a drain of 2×3 feet will carry its waters into the main sewer. Its length is 1028 feet; width 60 feet.

Bay Street.

Bay street, from Wellington to Maria streets, measures 1276, by 58 feet wide. It will follow the conditions of Sally street, as far as its improvements are concerned, the drainage outfall from intersection of Queen street lying through Albert street. Its drain may be 2×3 .

Richmond Road.

From City limits to Concession B C, at junction of Maria street, the length of Richmond Road is 3387 feet; its width is 66 feet. It is the Concession line between A and the First Concession, in the Township of Nepean; and from the line dividing Lots 39 and 40, it forms the City boundary to its junction with the line dividing 38 and 39. It will require to be opened at the easterly end, where heavy rock cutting is necessary. Its drainage will be effected by Broad street, into Perkins street, and down the ravine into the proposed tailrace, below the present site of Pooley's Bridge. It will require a drain 2×3 feet.

Albert Street.

That portion of Albert street between B C and the Richmond Road finds its outlet for draining through the latter thoroughfare. It is 1010 feet in length, and 58 feet in width. It will require a drain of 1.6×2.6 .

Victoria Terrace.

Victoria Terrace extends from Richmond Road at its junction with Broad street, to Pooley's Bridge. It measures 2000 feet, by 58 feet in width. It requires only the usual improvements, and a drain of 1.6×2.6 . The outfall will be to Perkins street.

George's Street.

George's street, from the end of Pooley's Bridge, is 780 feet long, by 45 feet wide. At present it is formed by escarping the cliffs under which it runs, and forming the road by partly embanking. It requires to be widened, and its improvements are included in the estimates for the main thoroughfare. Its drainage area is limited, and need not have a sewer larger than 1.6×2.6 .

Concession B C.

This line crosses the City limits at the line dividing E and F from Lot Forty. It holds a northerly course till its junction with the Richmond Road and Maria street, where it may be said to terminate

at present on the edge of the cliff. Its length is 2770 feet, width 45 feet. The contemplated improvements consist in simply macadamizing this road. Its drainage outlet will be through Bank street, along the City limits. But as this portion of the City has not been laid out in streets, a consideration of its details are unnecessary, especially if any future contemplated extension of the City limits should include Lot 39 in the first Concession, its natural drainage would be in that direction to Richmond Road, through Perkins street to the ravine where the tailrace for the proposed water-works will discharge.

Wellington Street.

Occupying the slope of the Government Reserves called the Barrack Hill, on its southern face, and the cliffs on which the Episcopal Church stands, on the northern face, the drainage of Wellington street is governed by its peculiar location and its natural outfall, which is towards the river, at the upper end of this street; and its drainage should be delivered into the Ottawa nearly on the line of Concession B and C. Its length and width will not materially affect the question of drainage, because its fall is so great that a drain of 2×3 is more than ample.

The streets to the northward of it will be drained partly into it and partly into Victoria street, which will find an outlet through John street into the Ottawa River. The whole of this drainage will be—Victoria street, 1220 feet; John street, 327 feet; about 200 feet of Hugh, Sally, and Bank streets will be drained into Victoria street, and the balance into Wellington street. The dimensions of the drain for Victoria street will be 2×3 feet. The improvements on Victoria street will consist in excavating the eastern end, and raising it to a uniform grade from Hugh to Bank streets.

Le Britton's Flats.

With the exception of Queen and Duke streets, none of the thoroughfares are more than partially open. In this distance its drainage is governed by the outfall through Duke street to the river. Queen street is the proposed line of the Conduit for Water Works, and provision has been made in the estimates for improving all these streets.

The various Islands need not be taken into consideration, because they have drainage outfall in every direction.

In closing this description of the streets, it is evident that a thorough and comprehensive system of drainage is a first necessity,—that this system should follow the natural contour of the surface, and that it should be rendered as effective as possible by the capacity of the sewers and the outfall given thereto. I have so arranged that the drains will be at a minimum depth of ten feet below the surface of the street, thereby allowing fully a six foot cellar, and providing amply for outfall from house sinks, drains, &c. I would advise the adoption of effective sewer-traps in all street sewers, so arranged as to prevent gravel, sand, or other surface material, finding its way into the sewers. And, in conclusion, I think the necessity for commencing the main sewer during the present season is sufficiently apparent, and called for by the circumstances in which the city is placed. It is a mistaken idea to suppose that the desultory and miserable efforts heretofore made can be persisted in—too much money has been already wasted by this means, and the experience of last season points to the evils likely to be entailed on our increasing population by inattention to the first rules of social life.

ESTIMATE OF COST OF DRAINAGE.

Main Drain from Hugh Street to Rideau Street, at junction of King Street.

Dimensions, 2.6 x 3.6.

| | | | |
|--------------------------|----------------|------------|----------|
| 6145 feet Masonry, | at \$4.00..... | \$24580 00 | |
| 6145 do Brickwork, | 2.00..... | 12290 00 | |
| 4245 do Rock Excavation, | 3.00..... | 12735 00 | |
| 1900 do Clay do | 85c..... | 1615 00 | |
| | | <hr/> | 51220 00 |

797
7971337
1337*King Street to Cathcart.*

Drain 3.6 x 5.6.

| | | | |
|---------------------|----------------|------------|----------|
| 2680 feet Masonry, | at \$5.00..... | \$13400 00 | |
| 2680 do Brickwork, | 2.25..... | 6030 00 | |
| 2680 do Excavation, | 1.25..... | 3350 00 | |
| | | <hr/> | 22780 00 |

2080
2080*Cathcart to Dalhousie, and Dalhousie to Low Water of the Ottawa.*

| | | | |
|--------------------------|----------------|------------|-------------|
| 2777 feet Masonry, | at \$6.50..... | \$18050 50 | |
| 2777 do Brickwork, | 3.00..... | 8331 00 | |
| 1165 do Clay Excavation, | 1.50..... | 1747 50 | |
| 1612 do Rock do | 13.00..... | 20956 00 | |
| 440 do Masonry, | 6.50..... | 2860 00 | |
| 440 do Brickwork, | 3.00..... | 1320 00 | |
| 440 do Rock Excavation, | 13.00..... | 5720 00 | |
| | | <hr/> | 58985 00 |
| | | | <hr/> |
| | | | \$132985 00 |

2266
22662532
2532*McKay Street.*

Drain 1.6 x 2.6.

Including refilling, and connections for house and street drainage.

| | | | |
|-------------------------|----------------|-----------|---------|
| 840 feet of Sewer, | at \$1.25..... | \$1050 00 | |
| 840 do Rock Excavation, | 2.00..... | 1680 00 | |
| | | <hr/> | 2730 00 |

1473
1473*Metcalfe Street.*

Sewer 1.6 x 2.6. Including refilling and connections, &c.

| | | | |
|--------------------------|----------------|-----------|---------|
| 2590 feet of Sewer, | at \$1.25..... | \$3237 50 | |
| 2590 do Rock Excavation, | 2.00..... | 5180 00 | |
| | | <hr/> | 8417 50 |

2400
2400*Carried forward.....* \$144182 50

Brought forward..... \$144132 50

Baird Street.

Sewer 1.6 x 2.6.

| | | |
|-----------------------------------|----------|---------|
| 797 feet of Sewer, at \$1.25..... | \$996 25 | |
| 797 do Excavation, 50c..... | 398 50 | |
| | <hr/> | 1394 75 |

Redpath Street.

Sewer 1.6 x 2.6.

| | | |
|------------------------------------|-----------|---------|
| 1837 feet of Sewer, at \$1.25..... | \$1671 25 | |
| 1837 do Excavation, 50c..... | 668 50 | |
| | <hr/> | 2339 75 |

McTaggart Street.

Sewer 1.6 x 2.6.

| | | |
|------------------------------------|-----------|---------|
| 2080 feet of Sewer, at \$1.25..... | \$2600 00 | |
| 2080 do Excavation, 50c..... | 1040 00 | |
| | <hr/> | 3640 00 |

Boteler Street.

Sewer 1.6 x 2.6.

| | | |
|------------------------------------|-----------|---------|
| 2266 feet of Sewer, at \$1.25..... | \$2832 50 | |
| 2266 do Excavation, 50c..... | 1133 00 | |
| | <hr/> | 3965 50 |

Bolton Street.

Sewer 1.6 x 2.6.

| | | |
|------------------------------------|-----------|---------|
| 2532 feet of Sewer, at \$1.25..... | \$3165 00 | |
| 2532 do Excavation, 50c..... | 1266 00 | |
| | <hr/> | 4431 00 |

Cathcart Street.

Sewer 1.6 x 2.6.

| | | |
|------------------------------------|-----------|---------|
| 1473 feet of Sewer, at \$1.25..... | \$1841 25 | |
| 1473 do Excavation, 50c..... | 736 50 | |
| | <hr/> | 2577 75 |

Bolton Street.

Sewer 2 x 3.

| | | |
|------------------------------------|-----------|---------|
| 2400 feet of Sewer, at \$2.25..... | \$5400 00 | |
| 2400 do Excavation, 50c..... | 1200 00 | |
| | <hr/> | 6600 00 |

Carried forward..... \$169081 25

Brought forward..... \$189081 25

St Andrew's Street.

Sewer 2 1/2 3.

| | | | |
|---------------------|----------------|-----------|---------|
| 2187 feet of Sewer, | at \$2.25..... | \$4920 75 | |
| 2187 do Excavation, | 50c..... | 1093 50 | |
| | | <hr/> | 6014 25 |

1863
1863

Park Street.

Sewer 2 1/2 3.

| | | | |
|---------------------|----------------|-----------|---------|
| 1871 feet of Sewer, | at \$2.25..... | \$4209 75 | |
| 1871 do Excavation, | 50c..... | 935 50 | |
| | | <hr/> | 5145 25 |

2180
2180

Church Street.

Sewer 2 1/2 3.

| | | | |
|---------------------|----------------|-----------|---------|
| 2188 feet of Sewer, | at \$2.25..... | \$4923 00 | |
| 2188 do Excavation, | 50c..... | 1094 00 | |
| | | <hr/> | 6017 00 |

1890
1890

St. Patrick Street.

Sewer 2 1/2 3.

| | | | |
|---------------------|----------------|-----------|---------|
| 2183 feet of Sewer, | at \$2.25..... | \$4911 75 | |
| 2183 do Excavation, | 50c..... | 1091 50 | |
| | | <hr/> | 6003 25 |

4500
4500

Ottawa Street.

Sewer 2 1/2 3.

| | | | |
|---------------------|----------------|-----------|---------|
| 2820 feet of Sewer, | at \$2.25..... | \$6345 00 | |
| 2820 do Excavation, | 50c..... | 1410 00 | |
| | | <hr/> | 7755 00 |

2614
2614

Murray Street.

Sewer 2 1/2 3.

| | | | |
|---------------------|----------------|-----------|---------|
| 2183 feet of Sewer, | at \$2.25..... | \$4911 75 | |
| 2183 do Excavation, | 50c..... | 1091 50 | |
| | | <hr/> | 6003 25 |

1820
1820

Clarence Street.

Sewer 2 1/2 3.

| | | | |
|---------------------|----------------|-----------|---------|
| 2183 feet of Sewer, | at \$2.25..... | \$4911 75 | |
| 2183 do Excavation, | 50c..... | 1091 50 | |
| | | <hr/> | 6003 25 |

1246
1246

Carried forward..... \$212022 50

189081 25 Brought forward..... \$212022 50

Parry Street.

Sewer 2 1/2 3.

| | | |
|------------------------------------|-----------|---------|
| 1363 feet of Sewer, at \$2.25..... | \$3066 75 | |
| 1363 do Excavation, 50c..... | 681 50 | |
| | <hr/> | 3748 25 |

6014 25

York Street.

Sewer 2 1/2 3.

| | | |
|------------------------------------|-----------|---------|
| 2180 feet of Sewer, at \$2.25..... | \$4905 00 | |
| 2180 do Excavation, 50c..... | 1090 00 | |
| | <hr/> | 5995 00 |

5145 25

George Street.

Sewer 2 1/2 3.

| | | |
|------------------------------------|-----------|---------|
| 1690 feet of Sewer, at \$2.25..... | \$3802 50 | |
| 1690 do Excavation, 50c..... | 845 00 | |
| | <hr/> | 4647 50 |

6017 00

Rideau Street.

Sewer 2 1/2 3.

| | | |
|------------------------------------|------------|----------|
| 4500 feet of Sewer, at \$2.25..... | \$10125 00 | |
| 4500 do Excavation, 75c..... | 3375 00 | |
| | <hr/> | 13500 00 |

6003 25

Cumberland Street.

Sewer 1.6 1/2 2.6.

| | | |
|------------------------------------|-----------|---------|
| 2614 feet of Sewer, at \$1.25..... | \$3267 50 | |
| 2614 do Excavation, 50c..... | 1307 00 | |
| | <hr/> | 4574 50 |

7755 00

Carleton Street.

Sewer 1.6 1/2 2.6.

| | | |
|------------------------------------|-----------|---------|
| 1820 feet of Sewer, at \$1.25..... | \$2275 00 | |
| 1820 do Excavation, 50c..... | 910 00 | |
| | <hr/> | 3185 00 |

6003 25

King Street.

Sewer 1.6 1/2 2.6.

| | | |
|------------------------------------|-----------|---------|
| 1246 feet of Sewer, at \$1.25..... | \$1557 50 | |
| 1246 do Excavation, 50c..... | 623 00 | |
| | <hr/> | 2180 50 |

6003 25

212022 50 Carried forward..... \$249853 25

Brought forward..... \$249853 25

Nelson Street.

Sewer 1.6 x 2.6.

| | | | |
|---------------------|----------------|-----------|---------|
| 1523 feet of Sewer, | at \$1.25..... | \$1903 75 | |
| 1523 do Excavation, | 50c..... | 761 50 | |
| | | <hr/> | 2665 25 |

Gloucester Street.

Sewer 1.6 x 2.6.

| | | | |
|---------------------|----------------|-----------|---------|
| 1526 feet of Sewer, | at \$1.25..... | \$1907 50 | |
| 1526 do Excavation, | 50c..... | 763 00 | |
| | | <hr/> | 2670 50 |

SOUTH OF RIDEAU STREET.

Augusta Street.

Sewer 2 x 3.

| | | | |
|---------------------|----------------|-----------|---------|
| 1374 feet of Sewer, | at \$2.25..... | \$3091 50 | |
| 1374 do Excavation, | 50c..... | 687 00 | |
| | | <hr/> | 3778 50 |

Chapel Street.

Sewer 2 x 3.

| | | | |
|---------------------|----------------|-----------|---------|
| 1372 feet of Sewer, | at \$2.25..... | \$3087 00 | |
| 1372 do Excavation, | 50c..... | 686 00 | |
| | | <hr/> | 3773 00 |

Gloucester Street.

Sewer 2 x 3.

| | | | |
|---------------------|----------------|-----------|---------|
| 1369 feet of Sewer, | at \$2.25..... | \$3080 25 | |
| 1369 do Excavation, | 50c..... | 684 50 | |
| | | <hr/> | 3764 75 |

Nelson Street.

Sewer 2 x 3.

| | | | |
|---------------------|----------------|-----------|---------|
| 1372 feet of Sewer, | at \$2.25..... | \$3087 00 | |
| 1372 do Excavation, | 50c..... | 686 00 | |
| | | <hr/> | 3773 00 |

King Street.

Sewer 2 x 3.

| | | | |
|---------------------|----------------|-----------|---------|
| 1374 feet of Sewer, | at \$2.25..... | \$3091 50 | |
| 1374 do Excavation, | 50c..... | 697 00 | |
| | | <hr/> | 3788 50 |

Carried forward..... \$274056 75

249853 25

Brought forward.....\$274056 75

Cumberland Street.

Sewer 2 M 3.

| | | |
|---------------------|----------------|-----------|
| 1365 feet of Sewer, | at \$2.25..... | \$3071 25 |
| 1365 do Excavation, | 50c..... | 682 50 |

2665 25

3753 75

Ottawa Street.

Sewer 2 M 3.

| | | |
|---------------------|----------------|-----------|
| 1385 feet of Sewer, | at \$2.25..... | \$3116 25 |
| 1385 do Excavation, | 50c..... | 692 50 |

2670 50

4808 75

Nicholas Street.

Sewer 2 M 3.

| | | |
|---------------------|----------------|-----------|
| 1384 feet of Sewer, | at \$2.25..... | \$3114 00 |
| 1384 do Excavation, | 50c..... | 692 00 |

3778 50

3806 00

Mosgrove Street.

Sewer 2 M 3.

| | | |
|--------------------|----------------|----------|
| 400 feet of Sewer, | at \$2.25..... | \$900 00 |
| 400 do Excavation, | 50c..... | 200 00 |

3778 00

1100 00

Little Sussex Street.

Sewer 1.6 M 2.6.

| | | |
|--------------------|----------------|----------|
| 367 feet of Sewer, | at \$1.25..... | \$458 75 |
| 367 do Excavation, | 2.00..... | 734 00 |

3764 75

1192 75

St Paul Street.

Sewer 1.6 M 2.6.

| | | |
|--------------------|----------------|-----------|
| 912 feet of Sewer, | at \$1.25..... | \$1140 00 |
| 912 do Excavation, | 1.00..... | 912 00 |

3778 00

2052 00

Besserer Street.

Sewer 1.6 M 2.6.

| | | |
|---------------------|----------------|-----------|
| 5300 feet of Sewer, | at \$1.25..... | \$6625 00 |
| 5300 do Excavation, | 50c..... | 2650 00 |

3778 50

9275 00

274056 75

Carried forward.....\$300045 00

Brought forward..... \$300945 00

Daly Street.

Sewer 1.6 x 2.6.

| | | | |
|---------------------|----------------|-----------|---------|
| 4880 feet of Sewer, | at \$1.25..... | \$6100 00 | |
| 4880 do Excavation, | 50c..... | 2400 00 | |
| | | | 8540 00 |

Stewart Street.

Sewer 1.6 x 2.6.

| | | | |
|---------------------|----------------|-----------|---------|
| 4680 feet of Sewer, | at \$1.25..... | \$5850 00 | |
| 4680 do Excavation, | 50c..... | 2340 00 | |
| | | | 8190 00 |

Villbrod Street.

Sewer 1.6 x 2.6.

| | | | |
|---------------------|----------------|-----------|---------|
| 4160 feet of Sewer, | at \$1.25..... | \$5200 00 | |
| 4160 do Excavation, | 50c..... | 2080 00 | |
| | | | 7280 00 |

Theodore Street.

Sewer 1.6 x 2.6.

| | | | |
|---------------------|----------------|-----------|---------|
| 4440 feet of Sewer, | at \$1.25..... | \$5550 00 | |
| 4440 do Excavation, | 50c..... | 2220 00 | |
| | | | 7770 00 |

Wellington Street.

Sewer 2 x 3.

| | | | |
|---------------------|----------------|-----------|----------|
| 3680 feet of Sewer, | at \$2.25..... | \$8280 00 | |
| 3680 do Excavation, | 2.00..... | 7360 00 | |
| | | | 15640 00 |

Elgin Street.

Sewer 2 x 3.

| | | | |
|--------------------|----------------|-----------|---------|
| 530 feet of Sewer, | at \$2.25..... | \$1192 50 | |
| 530 do Excavation, | 2.00..... | 1060 00 | |
| | | | 2252 50 |

Metcalf Street.

Sewer 2 x 3.

| | | | |
|---------------------|----------------|-----------|---------|
| 1330 feet of Sewer, | at \$2 25..... | \$2992 00 | |
| 1330 do Excavation, | 2.00..... | 2660 00 | |
| | | | 5652 00 |

Carried forward..... \$355369 50

300045 00

Brought forward..... \$355369 50

O'Connor Street.

Sewer 2 1/2 3.

| | | |
|------------------------------------|-----------|---------|
| 1320 feet of Sewer, at \$2.25..... | \$2970 00 | |
| 1320 do Excavation, 2.00..... | 2640 00 | |
| | | 5610 00 |

8540 00

Bank Street.

Sewer 2 1/2 3.

| | | |
|------------------------------------|-----------|----------|
| 3050 feet of Sewer, at \$2.25..... | \$6862 50 | |
| 3050 do Excavation, 1.25..... | 3812 50 | |
| | | 10675 00 |

8190 00

Hugh Street.

Sewer 2 1/2 3.

| | | |
|------------------------------------|-----------|---------|
| 1296 feet of Sewer, at \$2.25..... | \$2916 00 | |
| 1296 do Excavation, 75c..... | 972 00 | |
| | | 3888 00 |

7280 00

Sally Street.

Sewer 2 1/2 3.

| | | |
|------------------------------------|-----------|---------|
| 1028 feet of Sewer, at \$2.25..... | \$2313 00 | |
| 2028 do Excavation, 1.00..... | 1023 00 | |
| | | 3341 00 |

7770 00

Bay Street.

Sewer 2 1/2 3.

| | | |
|------------------------------------|-----------|---------|
| 1276 feet of Sewer, at \$2.25..... | \$2871 00 | |
| 1276 do Excavation, 2.00..... | 2552 00 | |
| | | 5423 00 |

15640 00

Richmond Road.

Sewer 2 1/2 3.

| | | |
|------------------------------------|-----------|----------|
| 3337 feet of Sewer, at \$2.25..... | \$7508 25 | |
| 3337 do Excavation, 1.00..... | 3337 00 | |
| | | 10845 25 |

2252 50

Maria Street.

Sewer 2 1/2 3, and 1.6 1/2 2.6.

| | | |
|------------------------------------|-----------|----------|
| 1800 feet of Sewer, at \$2.25..... | \$4050 00 | |
| 1800 do Excavation, 1.25..... | 2250 00 | |
| 3160 do Sewer, 1.25..... | 3950 00 | |
| 3160 do Excavation, 75c..... | 2370 00 | |
| | | 12620 00 |

5652 00

55369 50

Carried forward..... \$407771 75

Brought forward..... \$407771 75

Albert Street.

Sewer 1.6 x 2.6.

| | | |
|------------------------------------|-----------|---------|
| 1010 feet of Sewer, at \$1.25..... | \$1262 50 | |
| 1010 do Excavation, 2.00..... | 2020 00 | |
| | | 3282 50 |

Victoria Terrace.

Sewer 2 x 5.

| | | |
|------------------------------------|-----------|---------|
| 2000 feet of Sewer, at \$2.25..... | \$4500 00 | |
| 2000 do Excavation, 1.00..... | 2000 00 | |
| | | 6500 00 |

George Street.

Sewer 1.6 x 2.6.

| | | |
|-----------------------------------|----------|---------|
| 780 feet of Sewer, at \$1.25..... | \$975 00 | |
| 780 do Excavation, 1.00..... | 780 00 | |
| | | 1755 00 |

Dalhousie Street.

Sewer 1.6 x 2.6.

| | | |
|------------------------------------|-----------|---------|
| 2602 feet of Sewer, at \$1.25..... | \$3252 00 | |
| 2602 do Excavation, 75c..... | 1951 50 | |
| | | 5203 50 |

Bank Street, North of Wellington.

Sewer 1.6 x 2.6.

| | | |
|-----------------------------------|----------|--------|
| 275 feet of Sewer, at \$1.25..... | \$343 75 | |
| 275 do Excavation, 2.00..... | 550 00 | |
| | | 893 75 |

Hugh Street.

Sewer 1.6 x 2.6.

| | | |
|-----------------------------------|----------|---------|
| 585 feet of Sewer, at \$1.25..... | \$731 25 | |
| 585 do Excavation, 50c..... | 292 50 | |
| | | 1023 75 |

Sally Street.

| | | |
|-----------------------------------|----------|--------|
| 340 feet of Sewer, at \$1.25..... | \$425 00 | |
| 340 do Excavation, 50c..... | 170 00 | |
| | | 595 00 |

Carried forward..... \$427025 25

07771 75

Brought forward..... \$427025 25

Victoria Street and John Street.

Sewer 2 1/2 3.

| | | |
|------------------------------------|-----------|----------------|
| 1547 feet of Sewer, at \$2.25..... | \$3400 75 | |
| 1547 do Excavation, 2.00..... | 3094 00 | |
| | | <u>6574 75</u> |

8282 50

Queen Street, on the Flats.

Sewer 1.6 1/2 2.6.

| | | |
|------------------------------------|-----------|----------------|
| 1190 feet of Sewer, at \$1.25..... | \$1487 50 | |
| 1190 do Excavation, 2.00..... | 2380 00 | |
| | | <u>3867 50</u> |

6500 00

Duke Street.

Sewer 2 1/2 3.

| | | |
|-----------------------------------|-----------|----------------|
| 872 feet of Sewer, at \$2.25..... | \$1962 00 | |
| 872 do Excavation, 2.00..... | 1744 00 | |
| | | <u>3706 00</u> |

1755 00

Bridge Street.

Sewer 1.6 1/2 2.6.

| | | |
|-----------------------------------|----------|----------------|
| 620 feet of Sewer, at \$1.25..... | \$775 00 | |
| 620 do Excavation, 2.00..... | 1240 00 | |
| | | <u>2015 00</u> |

5203 50

Sherwood Street.

Sewer 1.6 1/2 2.6.

| | | |
|-----------------------------------|----------|----------------|
| 698 feet of Sewer, at \$1.25..... | \$872 50 | |
| 698 do Excavation, 2.00..... | 1396 00 | |
| | | <u>2268 50</u> |

893 75

Bridge Street.

Sewer 2 1/2 3.

| | | |
|-----------------------------------|----------|----------------|
| 332 feet of Sewer, at \$2.25..... | \$747 00 | |
| 332 do Excavation, 2.00..... | 664 00 | |
| | | <u>1411 00</u> |

1023 75

Lloyd Street.

Sewer 1.6 1/2 2.6.

| | | |
|------------------------------------|-----------|----------------|
| 1213 feet of Sewer, at \$1.25..... | \$1516 25 | |
| 1213 do Excavation, 1.00..... | 1213 00 | |
| | | <u>2729 25</u> |

595 00

27025 25

Carried forward..... \$449597 25

Brought forward..... \$449597 25

Sparks Street.

Sewer 1.6 x 2.6.

| | | |
|------------------------------------|-----------|----------------|
| 4158 feet of Sewer, at \$1.25..... | \$5197 50 | |
| 4158 do Excavation, 1.50..... | 6287 00 | |
| | | <hr/> 11484 50 |

Queen Street.

Sewer 1.6 x 2.6.

| | | |
|------------------------------------|-----------|---------------|
| 2962 feet of Sewer, at \$1.25..... | \$3702 50 | |
| 2962 do Excavation, 1.00..... | 2962 00 | |
| | | <hr/> 6664 50 |

Perkins Street.

Sewer 2 x 3.

The drain through this street extends to the Bay, with power of flushing therefrom.

| | | |
|------------------------------------|-----------|----------------|
| 2719 feet of Sewer, at \$2.25..... | \$6117 75 | |
| 2719 do Excavation, 2.00..... | 5438 00 | |
| | | <hr/> 11555 75 |

Sussex Street.

Sewer 1.6 x 2.6.

| | | |
|------------------------------------|-----------|---------------|
| 2937 feet of Sewer, at \$1.25..... | \$3671 25 | |
| 2937 do Excavation, 90c..... | 2648 30 | |
| | | <hr/> 6314 55 |

Total..... \$485566 55

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## COST OF WATER WORKS.

*Conduit.*

Excavation from Queen Street to foot of Bay, distance 2,000 feet, 23 feet wide and 15 average depth.

|                                             | \$              | c.        |
|---------------------------------------------|-----------------|-----------|
| 25,925 yards Rock, at \$1 .....             | 25,925          | 00        |
| 2,000 feet Arch, 22 x 2, at \$3.....        | 6,000           | 00        |
| 4,000 feet Side-walls, 12 x 2, at \$2 ..... | 8,000           | 00        |
| Cistern, 60 x 20 x 12 = 533, at \$4 .....   | 2,182           | 00        |
| Wheel-house, 90 x 40 .....                  | 10,000          | 00        |
|                                             | <u>\$52,057</u> | <u>00</u> |

*Machinery.*

|                                                             |                 |           |
|-------------------------------------------------------------|-----------------|-----------|
| Two Water Wheels, 20 feet diameter and 15 feet wide ....    | 20,000          | 00        |
| Four Pumps, each 2 feet diameter and 4 feet stroke,         |                 |           |
| Connecting Rods, &c .....                                   | 2,000           | 00        |
| Three Air Vessels, Connections, Pipes, Valves, Gearing, &c. | 4,000           | 00        |
|                                                             | <u>\$26,000</u> | <u>00</u> |

*Reservoir.*

250 feet in length by 200 feet wide.

## FEET SUPERSTRUCTURE.

|                                                 | C. yds. |    |
|-------------------------------------------------|---------|----|
| Exterior Wall, 900 x 35 x 5 = 5,833 at \$8..... | 46,664  | 00 |
| Puddle, 864 x 32 x 4 = 4,096 at \$1.....        | 4,096   | 00 |
| Interior Wall, 810 x 35 x 4 = 4,200 at \$6..... | 25,200  | 00 |
| Parapet, 900 x 5 x 6 = 1,000 at \$10.....       | 10,000  | 00 |
| 40 Buttresses, 85 x 8 x 3 = 1,244.....          | 12,440  | 00 |

## FOUNDATIONS.

|                                                  | C. yds. |    |
|--------------------------------------------------|---------|----|
| Exterior Walls, 900 x 7 x 10 = 2,331 at \$3..... | 7,002   | 00 |
| Interior do 810 x 6 x 10 = 1,800 at \$3.....     | 5,400   | 00 |

## EXCAVATION.

|                                               |       |    |
|-----------------------------------------------|-------|----|
| 50,000 x 10 = 18 518 cubic yards, at 50c..... | 9,259 | 00 |
|-----------------------------------------------|-------|----|

## PUDDLE.

|                                             |       |    |
|---------------------------------------------|-------|----|
| 50,000 x 4 = 7,407 cubic yards, at \$1..... | 7,407 | 00 |
|---------------------------------------------|-------|----|

Carried forward ..... \$127,468 00



Brought forward..... \$127,468 00

CONCRETE.

50,000 x 3 = 5,555 cubic feet, at \$3..... 16,665 00

CUT STONE BOTTOM.

38,850 x 2 = 2,840 cubic yds., at \$6..... 17,040 00

\$161,173

Service and Distribution.

Rising Main—18 diameter 3,600 feet by 1" = 185.3 lbs. per  
foot = 667.080 at 2½c..... 16,677 00

Distribution—8,000 ft. 12" x ¼ = 110.6 p. f. 834.800 at 2½c. 22,120 00  
75,000 feet 6 x ¼ = 49.4 = 3,705,000 at 2½c. 92,625 00

\$131,422 00

Hydrants, Stop Cocks, &c..... 10,000 00

\$141,422 00

Summary.

Cost of Conduit and Wheel-house..... 52,057 00

Machinery..... 26,000 00

Reservoir..... 161,173 00

Service..... 141,422 00

\$380,652 00

Contingencies, 10 per cent..... 38,065 20

\$418,717 20

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McK
Met
Bair
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St. Pa
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Dalho
Cumb
Carle
King
Nelson
Glouc
Chape
Augu
Cobur
Charl
Wurt

LIST OF STREETS.

27,468 00

16,665 00

17,040 00

\$161,173

16,677 00

22,120 00

92,625 00

31,422 00

10,000 00

141,422 00

52,057 00

26,000 00

161,173 00

141,422 00

80,652 00

38,065 20

118,717 20

| | LENGTH. | WIDTH. |
|-------------------------|---------|----------|
| McKay Street..... | 870 | 60 |
| Metcalf Street | 2,590 | 60 |
| Baird Street | 797 | 60 |
| Redpath Street..... | 1,330 | 66 |
| McTaggart Street | 2,087 | 66 |
| Boteler Street | 2,266 | 66 |
| Bolton Street..... | 2,532 | 66 |
| Cathcart Street..... | 2,638 | 66 |
| Bolton Street | 2,400 | 62 |
| St. Andrews Street..... | 2,187 | 62 |
| Church Street..... | 2,188 | 62 |
| St. Patrick Street..... | 2,183 | 60 |
| Park Street | 1,871 | 62 |
| Ottawa Street..... | 2,820 | 66 |
| Sussex Street | 2,937 | 66 |
| Murray Street..... | 2,183 | 66 |
| Clarence Street..... | 2,133 | 63 |
| Parry Street | 1,363 | 64 |
| York Street..... | 2,180 | 132 |
| George Street..... | 1,690 | 125 |
| Rideau Street | 5,854 | 96 & 66½ |
| To Rideau Bridge | 460 | 35 |
| Bridge | 660 | 18 |
| St. Paul | 912 | 58 |
| Besserer | 5,300 | 58 |
| Daly | 4,880 | 58 |
| Stewart | 4,680 | 58 |
| Wilbrod | 4,160 | 58 |
| Theodore | 4,440 | 66 |
| Gloucester Road | 2,985 | 45 |
| Dalhousie Street..... | 4,213 | 58 |
| Cumberland..... | 2,614 | 58 |
| Carleton | 1,820 | 66 |
| King | 3,926 | 132 |
| Nelson | 1,523 | 58 |
| Gloucester | 1,526 | 65 |
| Chapel | 1,535 | 66 |
| Augusta | 1,538 | 66 |
| Coburg | 1,543 | 60 |
| Charlotte | 1,550 | 60 |
| Wurtemberg | 1,400 | 59 |

South of Rideau Street.

| | LENGTH. | WIDTH. |
|---------------------|---------|--------|
| Augusta | 1,374 | 66 |
| Chapel | 1,372 | 66 |
| Gloucester | 1,369 | 65 |
| Neison | 1,372 | 58 |
| King | 1,374 | 66 |
| Cumberland | 1,365 | 58 |
| Ottawa | 1,385 | 61 |
| Nicholas | 1,384 | 58 |
| Mosgrove | 400 | 60 |
| Little Sussex | 367 | 33 |
| William | 198 | 38 |

Upper Town.

| | | |
|---|-------|----|
| Wellington Street, to be opened from Canal to Elgin Street | 400 | 96 |
| From Elgin to Hill's house | 3,680 | 96 |
| Sparks Street | 4,158 | 58 |
| Queen | 2,962 | 58 |
| Maria | 4,960 | 66 |
| Biddy | 2,458 | 35 |
| Centre | 4,195 | 35 |
| Elgin | 530 | 56 |
| Metcalfe | 1,330 | 60 |
| O'Connor | 1,320 | 61 |
| Bank | 3,050 | 40 |
| Hugh | 1,296 | 58 |
| Sally | 1,028 | 60 |
| Bay | 1,276 | 58 |
| Richmond Road | 3,337 | 66 |
| Albert Street | 1,010 | 58 |
| Victoria Terrace | 2,000 | 58 |
| George Street | 780 | 45 |
| Concession B C | 2,770 | 45 |
| Ashburnham Street | 620 | 38 |
| Percy | 625 | 35 |
| Nepean | 768 | 32 |
| Gloucester | 1,098 | 35 |

Streets North of Wellington.

| | | |
|-------------|-----|----|
| Bank | 275 | 66 |
| Hugh | 585 | 60 |
| Sally | 340 | 62 |

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WIDTH.

| | LENGTH. | WIDTH. |
|-------------------------|---------|--------|
| Victoria..... | 1,220 | 60 |
| John | 327 | 37 |
| Bay | 180 | 48 |
| <i>Plats.</i> | | |
| Pooley's Bridge..... | 145 | 24 |
| Approach to..... | 60 | 60 |
| Queen Street..... | 1,190 | 60 |
| Duke Street | 872 | 60 |
| Bridge..... | 620 | 60 |
| Sherwood | 698 | 70 |
| Bridge..... | 332 | .. |
| Bridge over Slides..... | 480 | 18 |
| Lloyd Street | 1,213 | 50 |

COST OF IMPROVING THE MAIN THOROUGHFARES.

| | FEET. |
|---|-----------------------|
| From Union Bridge to Head of Wooden Bridge over Slides... | 332 |
| From Wooden Bridge to Duke street. | 460 |
| Length of Duke street..... | 872 |
| " Queen street to Pooley's Bridge | 220 |
| " (Bridge) to George street..... | 65 |
| " (Bridge) to be filled in | 145 |
| " George street to Wellington..... | 785 |
| " Wellington to head of New Bridge..... | 4,080 |
| " Approaches to New Bridge | 330 |
| " Rideau street | 6,125 |
| " to Rideau Bridge | 460 |
| | <hr/> 13,874 <hr/> |
| To paving 13,874 feet, at \$2 per foot | \$27,748 |
| " Macadamizing 2,879 feet 26 feet wide, at \$1 per foot..... | 2,879 |
| " " 10,995 " 52 " \$2 " | 21,990 |
| " Excavation Rock, 7,267 yds, at \$1 | 7,267 |
| " Sand, Clay and Filling, 22,740 yds, at 20c..... | 4,548 |
| " Flagging 9,578 feet, 24 feet wide, at \$2..... | 19,156 |
| " Side Gutters, 27,088 feet, at 25c. per foot..... | 6,772 |
| " Bridge over Rideau River, 540 feet, at \$10..... | 5,400 |
| " Iron Bridge over Canal, 100 feet, at \$105 | 10,500 |
| | <hr/> \$106,260 <hr/> |

Brought forward..... \$106,260 00

COST OF PAVING AND MACADAMIZING.

Sussex Street.

| | | |
|---------------|----------------------------------|-------------------|
| Paving, | 2,957 feet, at \$2..... | \$5,914 00 |
| Macadamizing, | 2,957 = 22 ft. wide, at 80c..... | 2,356 60 |
| Filling, | 7000 yards, at 25c..... | 1,750 00 |
| Side Gutters, | 5,874 feet, at 25c..... | 1,468 50 |
| | | <hr/> \$11,489 10 |

Metcalfs Street.

| | | |
|----------------|-----------------------------------|-----------------|
| Paving, | 2,595 = 20 ft. wide, at \$2..... | 5,190 00 |
| Macadamizing, | 2,595 = 16 do 75c..... | 1,946 25 |
| Filling, | 21,500, at 20c..... | 4,300 00 |
| Excavation, | 550 yards rock, at \$1..... | 550 00 |
| Side Flagging, | 2,595 = 24 feet wide, at \$2..... | 5,190 00 |
| Gutters, | 5,190, at 25c..... | 1,297 50 |
| | | <hr/> 18,473 75 |

McKay Street.

| | | |
|-------------------|------------------------------|----------------|
| Macadamizing, | 870 = 36 ft. wide, at \$1.50 | 1,305 00 |
| Gravel Sidewalks, | 1,740 = 12 do 70c. | 1,218 00 |
| Stone Curbing, | 1,740 do 25c. | 435 00 |
| Gutters, | 1,740 do 25c. | 435 00 |
| | | <hr/> 3,393 00 |

Baird Street.

| | | |
|-------------------|------------------------------|----------------|
| Macadamizing, | 797 = 36 ft. wide, at \$1.50 | 1,195 50 |
| Filling, | | 1,000 00 |
| Gravel Sidewalks, | 797 = 24 ft. wide, at \$1.40 | 1,115 80 |
| Stone Curbing, | 1,594 do 25c. | 398 50 |
| Gutters, | 1,594 do 25c. | 398 50 |
| | | <hr/> 4,108 30 |

Redpath Street.

| | | |
|-------------------|--------------------------------|----------------|
| Macadamizing, | 1,337 = 42 ft. wide, at \$1.60 | 2,139 20 |
| Gravel Sidewalks, | 1,337 = 24 do \$1.00 | 1,337 00 |
| Stone Curbing, | 2,674 do 25c. | 668 50 |
| Gutters, | 2,674 do 25c. | 668 50 |
| | | <hr/> 4,813 20 |

Carried forward..... \$148,537 35

6,260 00

Brought forward..... \$148,537 36

McTaggart Street.

(Ottawa and Prescott Railway occupies the centre of this street, a width of 20 feet clear should be allowed to this Railway,—leaving 46 feet for roadway and sidewalks, or 27 feet to each side, 10 for sidewalk, and 14 for roadway, allowing 3 feet for gutter.)

1,489 10

| | | |
|-------------------|--------------------------------|----------------|
| Macadamizing, | 2,080 = 28 ft. wide, at \$1.10 | 2,288 00 |
| Gravel Sidewalks, | 2,080 do \$1.10 | 2,288 00 |
| Stone Curbing, | 4,160 do 25c. | 1,040 00 |
| Gutters, | 4,160 do 25c. | 1,040 00 |
| | | <hr/> 6,656 00 |

Boteler Street.

8,473 75

| | | |
|-------------------|--------------------------------|----------------|
| Macadamizing, | 2,266 = 43 ft. wide, at \$1.60 | 3,625 60 |
| Gravel Sidewalks, | 2,266 = 24 do 1.00 | 2,266 00 |
| Stone Curbing, | 4,532 do 25c. | 1,133 00 |
| Gutters, | 4,532 do 25c. | 1,133 00 |
| | | <hr/> 8,157 60 |

Bolton Street.

3,393 00

| | | |
|-------------------|--------------------------------|----------------|
| Macadamizing, | 2,532 = 42 ft. wide, at \$1.60 | 4,051 20 |
| Gravel Sidewalks, | 2,532 = 24 do \$1 | 2,532 00 |
| Stone Curbing, | 5,064 do 25c. | 1,266 00 |
| Gutters, | 5,064 do 25c. | 1,266 00 |
| | | <hr/> 9,115 20 |

Oathcart Street.

4,108 30

| | | |
|-------------------|--------------------------------|----------------|
| Macadamizing, | 2,638 = 42 ft. wide, at \$1.60 | 4,220 80 |
| Gravel Sidewalks, | 2,638 = 24 do \$1 | 2,638 00 |
| Stone Curbing, | 5,276 do 25c. | 1,319 00 |
| Gutters, | 5,276 do 25c. | 1,319 00 |
| | | <hr/> 9,496 80 |

Bolton Street.

4,818 20

8,537 35

| | | |
|-------------------|--------------------------------|----------------|
| Macadamizing | 2,400 = 38 ft. wide, at \$1.50 | 3,600 00 |
| Gravel Sidewalks, | 2,400 = 24 do \$1 | 2,400 00 |
| Stone Curbing, | 4,800 do 25c. | 1,200 00 |
| Gutters, | 4,800 do 25c. | 1,200 00 |
| | | <hr/> 8,400 00 |

Carried forward..... \$190,362 95

Brought forward..... \$190,362 95

St. Andrew Street.

| | | | |
|-------------------|--------------------------------|----------|----------|
| Macadamizing, | 2,187 = 38 ft. wide, at \$1.50 | 3,280 50 | |
| Gravel Sidewalks, | 2,187 = 24 do \$1 | 2,187 00 | |
| Stone Curbing, | 4,374 do 25c. | 1,093 50 | |
| Gutters, | 4,374 do 25c. | 1,093 50 | |
| | | | 7,654 50 |

Church Street.

| | | | |
|-------------------|--------------------------------|----------|----------|
| Macadamizing, | 2,188 = 38 ft. wide, at \$1.50 | 3,282 00 | |
| Gravel Sidewalks, | 2,188 = 24 do \$1 | 2,188 00 | |
| Stone Curbing, | 4,376 do 25c. | 1,094 00 | |
| Gutters, | 4,376 do 25c. | 1,094 00 | |
| | | | 7,658 00 |

St. Patrick Street.

| | | | |
|-------------------|--------------------------------|----------|----------|
| Macadamizing, | 2,183 = 36 ft. wide, at \$1.45 | 3,165 35 | |
| Gravel Sidewalks, | 2,183 = 24 do \$1 | 2,183 00 | |
| Stone Curbing, | 4,366 do 25c. | 1,091 50 | |
| Gutters, | 4,366 do 25c. | 1,091 50 | |
| | | | 7,531 35 |

Park Street.

| | | | |
|-------------------|--------------------------------|----------|----------|
| Macadamizing, | 1,871 = 38 ft. wide, at \$1.50 | 2,806 50 | |
| Gravel Sidewalks, | 1,871 = 24 do \$1 | 1,871 00 | |
| Stone Curbing, | 3,742 do 25c. | 935 50 | |
| Gutters, | 3,742 do 25c. | 935 50 | |
| | | | 6,548 50 |

Ottawa Street.

| | | | |
|-------------------|--------------------------------|----------|-----------|
| Macadamizing, | 2,820 = 42 ft. wide, at \$1.60 | 4,512 00 | |
| Gravel Sidewalks, | 2,820 = 24 do \$1 | 2,820 00 | |
| Stone Curbing, | 5,640 do 25c. | 1,410 00 | |
| Gutters, | 5,640 do 25c. | 1,410 00 | |
| | | | 10,152 00 |

Murray Street.

| | | | |
|-------------------|--------------------------------|----------|----------|
| Macadamizing, | 2,183 = 42 ft. wide, at \$1.60 | 3,492 80 | |
| Gravel Sidewalks, | 2,183 = 24 do \$1 | 2,183 00 | |
| Stone Curbing, | 4,366 do 25c. | 1,091 50 | |
| Gutters, | 4,366 do 25c. | 1,091 50 | |
| | | | 7,858 80 |

Carried forward..... \$237,766 10

Brought forward..... \$287,766 10

Clarence Street.

| | | |
|-------------------|--------------------------------|----------------|
| Macadamizing, | 2,183 = 39 ft. wide, at \$1.55 | 3,383 65 |
| Gravel Sidewalks, | 2,183 = 24 do \$1 | 2,183 00 |
| Stone Curbing, | 4,366 do 25c. | 1,091 50 |
| Gutters, | 4,366 do 25c. | 1,091 50 |
| | | <hr/> 7,749 65 |

Parry Street.

| | | |
|-------------------|---------------------------------|----------------|
| Macadamizing, | 1,363 = 40½ ft. wide, at \$1.50 | 2,126 28 |
| Gravel Sidewalks, | 1,363 = 24 do \$1 | 1,363 00 |
| Stone Curbing, | 2,726 do 25c. | 681 50 |
| Gutters, | 2,726 do 25c. | 681 50 |
| | | <hr/> 4,852 28 |

York Street.

| | | |
|-------------------|---------------------------------|-----------------|
| Macadamizing, | 2,180 = 108 ft. wide, at \$4.10 | 8,938 00 |
| Gravel Sidewalks, | 2,180 = 24 do \$1 | 2,180 00 |
| Gutters, | 4,360 do 25c. | 1,090 00 |
| Curbing, | 4,360 do 25c. | 1,090 00 |
| | | <hr/> 13,298 00 |

George Street.

| | | |
|-------------------|---------------------------------|-----------------|
| Macadamizing, | 1,690 = 101 ft. wide, at \$3.97 | 6,709 30 |
| Gravel Sidewalks, | 1,690 = 24 do \$1 | 1,690 00 |
| Gutters, | 3,380 do 25c. | 845 00 |
| Curbing, | 3,380 do 25c. | 845 00 |
| | | <hr/> 10,089 30 |

St. Paul Street.

| | | |
|-------------------|------------------------------|----------------|
| Macadamizing, | 912 = 34 ft. wide, at \$1.40 | 1,276 80 |
| Gravel Sidewalks, | 912 = 24 do \$1 | 912 00 |
| Gutters, | 1,824 do 25c. | 456 00 |
| Curbing, | 1,824 do 25c. | 456 00 |
| | | <hr/> 3,100 80 |

Besserer Street.

| | | |
|---|--------------------------------|-----------------|
| Macadamizing, | 5,300 = 34 ft. wide, at \$1.40 | 7,420 00 |
| Gravel Sidewalks, | 5,300 = 24 do \$1 | 5,300 00 |
| Gutters, | 10,600 do 25c. | 2,650 00 |
| Curb Stones, | 10,600 do 25c. | 2,650 00 |
| Cutting and filling 22,222 cubic yards, at 20c. | | 4,444 40 |
| | | <hr/> 22,464 40 |

Carried forward..... \$290,320 58

Brought forward..... \$299,320 03

Daly Street.

| | | | |
|--------------------|--------------------------------|----------|-----------|
| Macadamizing, | 4,880 = 34 ft. wide, at \$1.40 | 6,832 00 | |
| Gravel Sidewalks, | 4,880 = 24 do \$1.00 | 4,880 00 | |
| Gutters, | 9,760 do 25c. | 2,440 00 | |
| Curb Stones, | 9,760 do 25c. | 2,440 00 | |
| Cutting 6,222 yds. | 10c. | 622 20 | |
| | | | 17,214 20 |

Stewart Street.

| | | | |
|-------------------|--------------------------------|----------|-----------|
| Macadamizing, | 4,680 = 34 ft. wide, at \$1.40 | 6,552 00 | |
| Gravel Sidewalks, | 4,680 = 25 do \$1.00 | 4,680 00 | |
| Gutters, | 9,360 do 25c. | 2,340 00 | |
| Curb Stones, | 9,360 do 25c. | 2,340 00 | |
| | | | 15,912 00 |

Wilbrod Street.

| | | | |
|-------------------|--------------------------------|----------|-----------|
| Macadamizing, | 4,160 = 34 ft. wide, at \$1.40 | 5,824 00 | |
| Gravel Sidewalks, | 4,160 = 24 do \$1.00 | 4,160 00 | |
| Gutters, | 8,320 do 25c. | 2,080 00 | |
| Curb Stones, | 8,320 do 25c. | 2,080 00 | |
| | | | 14,144 00 |

Theodore Street.

| | | | |
|-------------------|--------------------------------|----------|-----------|
| Macadamizing, | 4,440 = 42 ft. wide, at \$1.60 | 7,104 00 | |
| Gravel Sidewalks, | 4,440 = 24 do \$1.00 | 4,440 00 | |
| Gutters, | 8,880 do 25c. | 2,220 00 | |
| Curb Stones, | 8,880 do 25c. | 2,220 00 | |
| | | | 15,984 00 |

Gloucester Road.

| | | | |
|---------------|--------------------------------|----------|----------|
| Macadamizing, | 2,985 = 34 ft. wide, at \$1.40 | 4,179 00 | |
| Water tables, | 5,970 = 5c. | 298 50 | |
| Filling, | | 1,000 00 | |
| | | | 5,477 50 |

Dalhousie Street.

| | | | |
|-------------------|--------------------------------|----------|-----------|
| Macadamizing, | 4,213 = 34 ft. wide, at \$1.40 | 5,898 20 | |
| Gravel Sidewalks, | 4,213 = 24 do \$1.00 | 4,213 00 | |
| Gutters, | 8,426 do 25c. | 2,106 50 | |
| Curb Stones, | 8,426 do 25c. | 2,106 50 | |
| | | | 14,324 20 |

Carried forward..... \$382,376 43

99,320 53

Brought forward..... \$382,376 43

Cumberland Street.

17,214 20

| | | |
|---|--------------------------------|-----------------|
| Macadamizing, | 2,614 = 34 ft. wide, at \$1.40 | 3,659 60 |
| Sidewalks, | 2,614 = 24 do \$1.00 | 2,614 00 |
| Gutters, | 5,228 do 25c. | 1,307 00 |
| Curb Stones, | 5,228 do 25c. | 1,307 00 |
| Filling 21,455 C. yards, at 10c. on this street and Carleton, | | 2,145 50 |
| | | <hr/> 11,033 10 |

Carleton Street.

15,912 00

| | | |
|---------------|--------------------------------|----------------|
| Macadamizing, | 1,820 = 42 ft. wide, at \$1.60 | 2,912 00 |
| Sidewalks, | 1,820 = 24 do \$1.00 | 1,820 00 |
| Gutters, | 3,640 do 25c. | 910 00 |
| Curb Stones, | 3,640 do 25c. | 910 00 |
| | | <hr/> 6,552 00 |

King Street.

14,144 00

| | | |
|-----------------------------|---------------------------------|-----------------|
| Macadamizing, | 3,926 = 108 ft. wide, at \$4.10 | 16,096 60 |
| Sidewalks, | 3,926 = 24 do \$1.00 | 3,926 00 |
| Gutters, | 7,852 do 25c. | 1,963 00 |
| Curb Stones, | 7,852 do 25c. | 1,963 00 |
| Filling 58,100 yds. at 10c. | | 5,810 00 |
| | | <hr/> 29,758 60 |

15,984 00

Nelson Street.

| | | |
|-------------------|--------------------------------|----------------|
| Macadamizing, | 1,523 = 34 ft. wide, at \$1.40 | 2,132 20 |
| Gravel Sidewalks, | 1,523 = 24 do \$1.00 | 1,523 00 |
| Gutters, | 3,046 do 25c. | 761 50 |
| Curb Stones, | 3,046 do 25c. | 761 50 |
| | | <hr/> 5,178 20 |

5,477 50

Gloucester Street.

14,324 20

| | | |
|-------------------|--------------------------------|----------------|
| Macadamizing, | 1,526 = 41 ft. wide, at \$1.60 | 2,441 60 |
| Gravel Sidewalks, | 1,526 = 24 do \$1.00 | 1,526 00 |
| Gutters, | 3,052 do 25c. | 763 00 |
| Curb Stones, | 3,052 do 25c. | 763 00 |
| | | <hr/> 5,493 60 |

382,376 43

Carried forward..... \$440,391 93

Brought forward..... \$440,391 98

SOUTH OF RIDEAU STREET.

Augusta Street.

| | | | |
|---------------|--------------------------------|----------|----------------|
| Macadamizing, | 1,374 = 42 ft. wide, at \$1.60 | 2,198 40 | |
| Sidewalks, | 1,374 = 24 do \$1.00 | 1,374 00 | |
| Gutters, | 2,748 do 25c. | 687 00 | |
| Curb Stones, | 2,748 do 25c. | 687 00 | |
| | | | <hr/> 4,946 40 |

Chapel Street, South of Rideau.

| | | | |
|-------------------|--------------------------------|----------|----------------|
| Macadamizing, | 1,372 = 42 ft. wide, at \$1.60 | 2,195 20 | |
| Gravel Sidewalks, | 1,372 = 24 do \$1.00 | 1,372 00 | |
| Gutters, | 2,744 do 25c. | 686 00 | |
| Curb Stones, | 2,744 do 25c. | 686 00 | |
| | | | <hr/> 4,939 20 |

Gloucester Street.

| | | | |
|-------------------|--------------------------------|----------|----------------|
| Macadamizing, | 1,369 = 41 ft. wide, at \$1.60 | 2,190 40 | |
| Gravel Sidewalks, | 1,369 = 24 do \$1.00 | 1,369 00 | |
| Gutters, | 2,738 do 25c. | 684 50 | |
| Curb Stones, | 2,738 do 25c. | 684 50 | |
| | | | <hr/> 4,928 40 |

Nelson Street.

| | | | |
|-------------------|--------------------------------|----------|----------------|
| Macadamizing, | 1,372 = 34 ft. wide, at \$1.40 | 1,920 80 | |
| Gravel Sidewalks, | 1,372 = 24 do \$1.00 | 1,372 00 | |
| Gutters, | 2,744 do 24c. | 686 00 | |
| Curb Stones, | 2,744 do 25c. | 686 00 | |
| | | | <hr/> 4,664 80 |

King Street.

| | | | |
|---------------------------|--------------------------------|----------|----------------|
| Macadamizing, | 1,374 = 42 ft. wide, at \$1.60 | 2,198 40 | |
| Gravel Sidewalks, | 1,374 = 24 do \$1.00 | 1,374 00 | |
| Gutters, | 2,748 do 25c. | 687 00 | |
| Filling, | | 1,000 00 | |
| Curbing 2,748 ft. at 25c. | | 687 00 | |
| | | | <hr/> 5,946 40 |

Carried forward..... \$465,817 13

40,391 93

Brought forward..... \$465,817 13
Cumberland Street, South of Rideau,

| | | |
|-------------------|--------------------------------|----------------|
| Macadamizing, | 1,365 = 34 ft. wide, at \$1.40 | 1,911 00 |
| Gravel Sidewalks, | 1,365 = 24 do \$1.00 | 1,365 00 |
| Gutters, | 2,730 do 25c. | 682 50 |
| Curb Stones, | 2,730 do 25c. | 682 50 |
| | | <hr/> 4,641 00 |

Ottawa Street.

4,946 40

| | | |
|-------------------|--------------------------------|----------------|
| Macadamizing, | 1,385 = 40 ft. wide, at \$1.60 | 2,216 00 |
| Gravel Sidewalks, | 1,385 = 24 do \$1.00 | 1,385 00 |
| Gutters, | 2,770 do 25c. | 692 50 |
| Curb Stones, | 2,770 do 25c. | 692 50 |
| Filling, | | 1,000 00 |
| | | <hr/> 5,986 00 |

Nicholas Street.

4,939 20

| | | |
|-------------------|--------------------------------|----------------|
| Macadamizing, | 1,384 = 34 ft. wide, at \$1.40 | 1,937 60 |
| Gravel Sidewalks, | 1,384 = 24 do \$1.00 | 1,384 00 |
| Gutters, | 2,768 do 25c. | 692 00 |
| Curb Stones, | 2,768 do 25c. | 692 00 |
| | | <hr/> 4,705 60 |

Mosgrove Street.

4,928 40

| | | |
|-------------------|------------------------------|----------------|
| Macadamizing, | 400 = 36 ft. wide, at \$1.45 | 580 00 |
| Gravel Sidewalks, | 400 = do \$1.00 | 400 00 |
| Gutters, | 800 do 25c. | 200 00 |
| Curb Stones, | 800 do 25c. | 200 00 |
| | | <hr/> 1,380 00 |

Little Sussex Street.

4,664 80

| | | |
|-------------------|----------------------------|--------------|
| Macadamizing, | 367 = 21 ft. wide, at 70c. | 256 90 |
| Gravel Sidewalks, | 367 = 12 do 50c. | 183 50 |
| Gutters, | 734 do 25c. | 183 50 |
| Curb Stones, | 734 do 25c. | 183 50 |
| | | <hr/> 807 40 |

William Street.

5,946 40

| | | |
|-------------------|---------------------------|--------------|
| Macadamizing, | 200 = 24 ft wide, at 70c. | 140 00 |
| Gravel Sidewalks, | 200 = 18 do 75c. | 150 00 |
| Gutters, | 400 do 25c. | 100 00 |
| Curb Stones, | 400 do 25c. | 100 00 |
| | | <hr/> 490 00 |

465,817 13

Carried forward..... \$483,827 13

Brought forward..... \$488,827 13

UPPER TOWN.

Sparks Street.

| | | | |
|--|--------------------------------|-----------|-----------|
| Macadamizing, | 4,158 = 34 ft. wide, at \$1.40 | 5,821 20 | |
| Gravel Sidewalks, | 4,158 = 24 do \$1.00 | 4,158 00 | |
| Gutters, | 8,316 do 25c. | 2,079 00 | |
| Curb Stones, | 8,316 do 25c. | 2,079 00 | |
| Excavation Rock at upper end, to Bay Street, | | | |
| 21,900 yards, | at \$1.00 | 21,900 00 | |
| | | | 36,087 20 |

Queen Street.

| | | | |
|-------------------|--------------------------------|----------|-----------|
| Macadamizing, | 2,962 = 34 ft. wide, at \$1.40 | 4,146 80 | |
| Gravel Sidewalks, | 2,962 = 24 do \$1.00 | 2,962 00 | |
| Gutters, | 5,924 do 25c. | 1,481 00 | |
| Curb Stones, | 5,924 do 25c. | 1,481 00 | |
| | | | 10,070 80 |

Maria Street.

| | | | |
|-------------------|--------------------------------|----------|-----------|
| Macadamizing, | 4,960 = 42 ft. wide, at \$1.60 | 7,936 00 | |
| Gravel Sidewalks, | 4,960 = 24 do \$1.00 | 4,960 00 | |
| Gutters, | 9,920 do 25c. | 2,480 00 | |
| Curb Stones, | 9,920 do 25c. | 2,480 00 | |
| Excavation, | | 5,000 00 | |
| | | | 22,856 00 |

Biddy Street.

| | | | |
|---------------|--------------------------------|----------|----------|
| Macadamizing, | 2,458 = 33 ft. wide, at \$1.40 | 3,441 20 | |
| Water tables, | 4,916 5c. | 246 80 | |
| | | | 3,687 00 |

Centre Street.

| | | | |
|---------------|--------------------------------|----------|----------|
| Macadamizing, | 4,195 = 33 ft. wide, at \$1.40 | 5,873 00 | |
| Water tables, | 8,390 5c. | 419 50 | |
| | | | 6,292 50 |

Elgin Street.

| | | | |
|-------------------|------------------------------|--------|----------|
| Macadamizing, | 530 = 36 ft. wide, at \$1.45 | 768 50 | |
| Gravel Sidewalks, | 530 = 24 do \$1.00 | 530 00 | |
| Gutters, | 1,060 do 25c. | 265 00 | |
| Curb Stones, | 1,060 do 25c. | 265 00 | |
| | | | 1,828 50 |

Carried forward..... \$564,599 12

Brought forward..... \$564,599 15

Metcalf Street.

| | | |
|-------------------|--------------------------------|----------------|
| Macadamizing, | 1,330 = 36 ft. wide, at \$1.45 | 1,928 50 |
| Gravel Sidewalks, | 1,330 = 24 do \$1.00 | 1,330 00 |
| Gutters, | 2,660 do 25c. | 665 00 |
| Curb Stones, | 2,260 do 25c. | 665 00 |
| | | <hr/> 4,588 50 |

O'Connor Street.

| | | |
|-------------------|--------------------------------|----------------|
| Macadamizing, | 1,320 = 37 ft. wide, at \$1.45 | 1,914 00 |
| Gravel Sidewalks, | 1,320 = do \$1.00 | 1,320 00 |
| Gutters, | 2,640 do 25c. | 660 00 |
| Curb Stones, | 2,640 do 25c. | 660 00 |
| | | <hr/> 4,554 00 |

Bank Street.

| | | |
|-------------------|--------------------------------|-----------------|
| Macadamizing, | 3,050 = 42 ft. wide, at \$1.60 | 4,880 00 |
| Gravel Sidewalks, | 3,050 = 24 do \$1.00 | 3,050 00 |
| Gutters, | 6,100 do 25c. | 1,525 00 |
| Curb Stones, | 6,100 do 25c. | 1,525 00 |
| | | <hr/> 10,980 00 |

Hugh Street.

| | | |
|-------------------|--------------------------------|----------------|
| Macadamizing, | 1,296 = 34 ft. wide, at \$1.40 | 1,814 40 |
| Gravel Sidewalks, | 1,296 = 24 do \$1.00 | 1,296 00 |
| Gutters, | 2,592 do 25c. | 648 00 |
| Curb Stones, | 2,592 do 25c. | 648 00 |
| | | <hr/> 4,406 40 |

Sally Street.

| | | |
|-------------------|--------------------------------|----------------|
| Macadamizing, | 1,028 = 36 ft. wide, at \$1.45 | 1,490 60 |
| Gravel Sidewalks, | 1,028 = 24 do \$1.00 | 1,028 00 |
| Curb Stones, | 2,056 do 25c. | 514 00 |
| Gutters, | 2,056 do 25c. | 514 00 |
| | | <hr/> 3,546 60 |

Bay Street.

| | | |
|-------------------|--------------------------------|----------------|
| Macadamizing, | 1,276 = 34 ft. wide, at \$1.40 | 1,786 40 |
| Gravel Sidewalks, | 1,276 = 24 do \$1.00 | 1,276 00 |
| Curb Stones, | 2,552 do 25c. | 638 00 |
| Gutters, | 2,552 do 25c. | 638 00 |
| | | <hr/> 4,388 40 |

Carried forward..... \$597,013 03

8,827 13

6,037 20

0,070 80

2,856 00

3,687 00

6,292 50

1,828 50

4,599 13

Brought forward..... \$597,013 03

Richmond Road.

| | | | |
|-------------------|--------------------------------|----------|-----------|
| Macadamizing, | 3,337 = 42 ft. wide, at \$1.60 | 5,339 20 | |
| Gravel Sidewalks, | 3,337 = 24 do \$1.00 | 3,337 00 | |
| Gutters, | 6,674 do 25c. | 1,668 50 | |
| Curb Stones, | 6,674 do 25c. | 1,668 50 | |
| | | | 12,013 20 |

Albert Street.

| | | | |
|-------------------|--------------------------------|----------|----------|
| Macadamizing, | 1,010 = 34 ft. wide, at \$1.40 | 1,414 00 | |
| Gravel Sidewalks, | 1,010 = 24 do \$1.00 | 1,010 00 | |
| Gutters, | 2,020 do 25c. | 505 00 | |
| Curb Stones, | 2,020 do 25c. | 505 00 | |
| | | | 3,434 00 |

Victoria Terrace.

| | | | |
|-------------------|--------------------------------|----------|----------|
| Macadamizing, | 2,000 = 34 ft. wide, at \$1.40 | 2,800 00 | |
| Gravel Sidewalks, | 2,000 = 24 do \$1.00 | 2,000 00 | |
| Gutters, | 4,000 do 25c. | 1,000 00 | |
| Curb Stones, | 4,000 do 25c. | 1,000 00 | |
| | | | 6,800 00 |

George Street.

| | | | |
|-------------------|----------------------------|--------|----------|
| Macadamizing, | 787 = 21 ft. wide, at 80c. | 624 00 | |
| Gravel Sidewalks, | 780 = 24 do \$1.00 | 780 00 | |
| Gutters, | 1,560 do 25c. | 390 00 | |
| Curb Stones, | 1,560 do 25c. | 390 00 | |
| | | | 2,184 00 |

Concession B and C.

| | | | |
|-------------------|------------------------------|----------|----------|
| Macadamizing, | 2,770 = 21 ft. wide, at 80c. | 2,216 00 | |
| Gravel Sidewalks, | 2,770 = 24 do \$1.00 | 2,770 00 | |
| Gutters, | 5,540 do 25c. | 1,385 00 | |
| Curb Stones, | 5,540 do 25c. | 1,385 00 | |
| | | | 7,756 00 |

Ashburnham Street.

| | | | |
|-------------------|----------------------------|--------|----------|
| Macadamizing, | 620 = 26 ft. wide, at 90c. | 558 00 | |
| Gravel Sidewalks, | 620 = 12 do 50c. | 310 00 | |
| Gutters, | 1,240 do 25c. | 310 00 | |
| Curb Stones, | 1,240 do 25c. | 310 00 | |
| | | | 1,488 00 |

Carried forward..... \$630,688 28

97,013 03

Brought forward..... \$630,688 23

Percy Street.

12,013 20

| | | |
|-------------------|----------------------------|----------------|
| Macadamizing, | 625 = 23 ft. wide, at 86c. | 537 50 |
| Gravel Sidewalks, | 626 = 12 do 50c. | 312 50 |
| Gutters, | 1,250 do 25c. | 312 50 |
| Curb Stones, | 1,250 do 25c. | 312 50 |
| | | <hr/> 1,475 00 |

Nepean Street.

3,434 00

| | | |
|-------------------|----------------------------|----------------|
| Macadamizing, | 768 = 20 ft. wide, at 80c. | 614 40 |
| Gravel Sidewalks, | 768 = 12 do 50c. | 384 00 |
| Gutters, | 1,536 do 25c. | 384 00 |
| Curb Stones, | 1,536 do 25c. | 384 00 |
| | | <hr/> 1,766 40 |

Gloucester Street.

6,800 00

| | | |
|-------------------|------------------------------|----------------|
| Macadamizing, | 1,098 = 23 ft. wide, at 83c. | 911 34 |
| Gravel Sidewalks, | 1,098 = 12 do 50c. | 549 00 |
| Gutters, | 2,196 do 25c. | 549 00 |
| Curb Stones, | 2,196 do 25c. | 549 00 |
| | | <hr/> 2,558 34 |

NORTH OF WELLINGTON STREET.

2,184 00

Bank Street.

7,756 00

| | | |
|-------------------|------------------------------|----------------|
| Macadamizing, | 275 = 42 ft. wide, at \$1.60 | 440 00 |
| Gravel Sidewalks, | 275 = 24 do \$1.00 | 275 00 |
| Gutters, | 550 do 25c. | 137 50 |
| Curb Stones, | 550 do 25c. | 137 50 |
| Filling, | | 200 00 |
| | | <hr/> 1,190 00 |

Hugh Street.

1,488 00

0,688 23

| | | |
|-------------------|------------------------------|----------------|
| Macadamizing, | 585 = 36 ft. wide, at \$1.45 | 848 25 |
| Gravel Sidewalks, | 585 = 24 do \$1.00 | 585 00 |
| Gutters, | 1,170 do 25c. | 292 50 |
| Curb Stones, | 1,170 do 25c. | 292 50 |
| | | <hr/> 2,018 25 |

Carried forward..... \$639,696 22

Brought forward..... \$689,696 22

Sally Street.

| | | | |
|-------------------|------------------------------|--------|----------|
| Macadamizing, | 340 = 38 ft. wide, at \$1.47 | 49 80 | |
| Gravel Sidewalks, | 340 = 24 do \$1.00 | 340 00 | |
| Gutters, | 680 do 25c. | 170 00 | |
| Curb Stones, | 680 do 25c. | 170 00 | |
| | | | 1,179 80 |

Victoria Street.

| | | | |
|-------------------|--------------------------------|----------|----------|
| Macadamizing, | 1,220 = 36 ft. wide, at \$1.45 | 1,769 00 | |
| Gravel Sidewalks, | 1,220 = 24 do \$1.00 | 1,220 00 | |
| Gutters, | 2,440 do 25c. | 610 00 | |
| Curb Stones, | 2,440 do 25c. | 610 00 | |
| | | | 4,209 00 |

John Street.

| | | | |
|-------------------|----------------------------|--------|--------|
| Macadamizing, | 145 = 25 ft. wide, at 87c. | 126 15 | |
| Gravel Sidewalks, | 145 = 12 do \$1.00 | 145 00 | |
| Gutters, | 290 do 25c. | 72 50 | |
| Curb Stone, | 290 do 25c. | 72 50 | |
| | | | 416 15 |

Queen Street (from Duke Street).

| | | | |
|-------------------|--------------------------------|----------|----------|
| Macadamizing, | 1,030 = 36 ft. wide, at \$1.45 | 1,493 50 | |
| Gravel Sidewalks, | 1,030 = 24 do \$1.00 | 1,030 00 | |
| Gutters, | 2,060 do 25c. | 515 00 | |
| Curb Stones, | 2,060 do 25c. | 515 00 | |
| | | | 3,553 50 |

Bridge Street.

| | | | |
|-------------------|------------------------------|--------|----------|
| Macadamizing, | 620 = 36 ft. wide, at \$1.45 | 899 00 | |
| Gravel Sidewalks, | 620 = 24 do \$1.00 | 620 00 | |
| Gutters, | 1,240 do 25c. | 310 00 | |
| Curb Stones, | 1,240 do 25c. | 310 00 | |
| | | | 2,139 00 |

Carried forward..... \$651,193 67

Brought forward..... \$651,193 67

Sherwood Street.

| | | | |
|-------------------|------------------------------|----------|-----------------|
| Macadamizing, | 698 = 46 ft. wide, at \$1.70 | 1,186 60 | |
| Gravel Sidewalks, | 698 = 24 do \$1.00 | 698 00 | |
| Gutters, | 1,396 do 25c. | 349 00 | |
| Curb Stones, | 1,396 do 25c. | 349 00 | |
| | | | <u>2,582 60</u> |

Lloyd Street.

| | | | |
|-------------------|------------------------------|----------|-----------------|
| Macadamizing, | 1,213 = 26 ft. wide, at 90c. | 1,091 70 | |
| Gravel Sidewalks, | 1,213 = 24 do \$1.00 | 1,213 00 | |
| Gutters, | 2,426 do 25c. | 606 50 | |
| Curb Stones, | 2,426 do 25c. | 606 50 | |
| | | | <u>3,517 70</u> |

Total..... \$657,293 97

89,696 22

1,179 80

4,209 00

416 15

3,553 50

2,139 00

1,193 67

SUMMARY OF COST.

| | |
|---|----------------|
| Drainage | \$185,556 55 |
| Water Works | 380,652 00 |
| Macadamization | 657,293 97 |
| | <hr/> |
| | \$1,523,502 52 |
| Contingencies and Superintendence, at 10 per cent. | 152,350 25 |
| | <hr/> |
| Total | \$1,675,852 77 |
| | <hr/> |

The interest on this sum, at six per cent. per annum, would be \$100,551 12, and, taking the present value of rateable property within the City Limits as equal to \$303,942, an assessment to meet that yearly demand for interest would be equal to 33½ cents in the dollar, or six and eight pence in the pound. It would not be necessary however, to provide for this large outlay at once; the work should be undertaken by instalments, and completed within a period of four years. The advantages of this mode of proceeding will be that the expenditure for those necessary works should be equalized on the progressive value of property, and the necessity of adding materially to the public burthen of the present inhabitants avoided. A consideration of the financial arrangements by which the great objects of this measure are to be attained, properly belongs to the City Council, and it is beyond all question that their action will be sustained by the rate-payers, in the effort to secure for the city full value in permanent and useful works of public improvement, for the outlay demanded. Every day's experience tends to prove the value of united action, operating by means of a known and comprehensive system in the accomplishment of works of such magnitude, as the wants of this city demand, because eventually, such a mode of procedure is far less expensive than the desultory, costly, inefficient and unsatisfactory measures hitherto employed for that purpose. The city is largely indebted for works of drainage, macadamization, and general improvements, and its streets are swamps, its sidewalks in the last stage of dilapidation, and its few drains stench traps or cess pools, where the sewage matter is carefully collected for the ex-

clusive benefit of the citizens. It would be no exaggeration to declare that the proposed outlay for this city during the present year, is utterly wasted, and of no use to the public interests.

As it is not advisable to commence all these works simultaneously, such portions as form the base of the system, should be selected as the first to be undertaken, and the construction of the main drain, main thoroughfare, and the Reservoir for the Water Works should be sufficient for the first year. The Estimates for those works would be as follows:

| | |
|---|---------------------|
| Main drain from Hugh Street to Ottawa River, as shewn | |
| in detailed estimates. Page 44..... | \$132,985 00 |
| Cost of improving main thoroughfares Page 59..... | 106,260 00 |
| Macadamizing King Street. Page 65..... | 29,758 60 |
| Cost of constructing Reservoir for Water Works. Pages | |
| 55, 56..... | 161,173 00 |
| | <hr/> |
| | \$130,176 60 |
| Contingencies and Superintendence, at 10 per cent..... | 43,017 66 |
| | <hr/> |
| Total..... | \$173,194 26 |
| | <hr/> |

The works undertaken for the second year, should be Sussex Street, Metcalf Street, York Street, Clarence, Murray and Patrick Streets, with the remainder of the Water Works. The Estimates would be as follows:

| | |
|---|--------------------|
| Cost of draining Sussex Street. Page 54..... | \$3,314 55 |
| do Metcalf Page 44..... | 8,417 50 |
| do York Page 47..... | 5,995 00 |
| do Clarence Page 46..... | 6,003 25 |
| do Murray Page 46..... | 6,003 25 |
| do Patrick Street, "..... | 6,003 25 |
| | <hr/> |
| Cost of draining..... | \$38,736 80 |

| | | |
|-------------------------------------|--------------|-------------|
| Cost of Macadamizing Sussex Street. | Page 60..... | \$11,489 10 |
| do Metcalf | " | 18,473 75 |
| do York | Page 63..... | 13,298 00 |
| do Clarence | " | 7,749 65 |
| do Murray | Page 62..... | 7,858 80 |
| do St. Patrick | " | 7,531 35 |
| Total..... | | \$66,400 65 |

Water Works.

| | | |
|--|---------------|--------------|
| Cost of Conduit, Wheel-house, Rising Main, Service, and | | |
| Distribution. | Page 56 | \$219,479 00 |
| Drainage | | 38,736 80 |
| | | <hr/> |
| | | \$324,615 45 |
| Contingencies, Superintendence, &c., at 10 per cent..... | | 32,461 64 |
| | | <hr/> |
| Total | | \$357 077 09 |

The outlay for the third year should embrace the leading thoroughfares as the Richmond Road, the Gloucester Road, Cumberland, Dalhousie, George, Church, St. Andrew, Bolton, Cathcart, Boteler, Carleton, Relpath, McTigart and Baird Streets.

| | | |
|-------------------------|--------------|-------------|
| Draining Richmond Road. | Page 51..... | \$10,845 25 |
| do Cumberland St. | Page 47..... | 4,574 50 |
| do Carleton | " | 3,185 00 |
| do Dalhousie | Page 52..... | 5,293 50 |
| do George | Page 47..... | 4,647 50 |
| do Church | Page 46..... | 6,017 00 |
| do St. Andrew's | Page 46..... | 6 014 25 |
| do Bolton | Page 45..... | 6,600 00 |
| do Cathcart | " | 2,577 75 |
| | | <hr/> |
| Carried forward..... | | \$49,664 75 |

11,489 10
 18,473 75
 13,298 00
 7,749 65
 7,858 80
 7,531 35

66,400 65

19,479 00

38,736 80

24,615 45

32,461 64

57 077 09

thorough-
 mberland,
 , Boteler,

10,845 25

4,574 50

3,185 00

5,293 50

4,647 50

6,017 00

6 014 25

6,600 00

2,577 75

49,664 75

Brought forward..... \$19 664 75

| | | |
|-------------------------|--------------|----------|
| Draining Bolton Street. | Page 45..... | 4,431 00 |
| do Redpath | " | 2 339 75 |
| do McTaggart | " | 3 610 00 |
| do Baird | " | 1,394 75 |

Total \$61 470 25

| | | |
|-------------------------------------|----------------|-------------|
| Cost of Macadamizing Richmond Road. | Page 70..... | \$12,013 20 |
| do Cumberland St. | Page 65..... | 11,053 10 |
| do Carleton | " | 6,552 00 |
| do Dalhousie | " Page 64..... | 14,524 20 |
| do George | " Page 63..... | 10 089 30 |
| do St Andrew's | " Page 62..... | 7 654 50 |
| do Church | " | 7,658 00 |
| do Bolton | " Page 61..... | 8,400 00 |
| do Cathcart | " | 9,496 80 |
| do Bolton | " | 9,115 20 |
| do Redpath | " Page 60..... | 4,813 20 |
| do McTaggart | " Page 61..... | 6,656 00 |
| do Baird | " Page 60..... | 4,108 30 |
| do Gloucester Road, | Page 64..... | 5,477 50 |

Total..... \$117,391 30

Drainage \$61,470 25

Macadamization 117,391 30

Total..... \$178 861 55

Superintendence and Contingencies, 10 per cent..... 17,886 15

Cost of third year's operations..... \$196 747 70

The balance to be expended for the fourth year will be large, and may probably be divided over 2 or 3 years. As the first three year's operations are directed to the completion of such works as are most needful, it will not much affect the general interest, if the balance, amounting to \$648 833 72 of the whole estimate is not laid out for a much longer period, all the streets upon which this sum should be expended are, with the exception of Sparks Street, comparatively of little importance, not extensively built upon, and naturally occupying such positions as would render the immediate application of measures of improvement unnecessary. One of the chief considerations which have influenced my decision in the appropriation of these sums, arises from the absolute necessity of applying prompt remedies to the evils under which the low lying portions of the city are suffering, as well as to prevent the wasteful, useless and outrageous expenditure of public money on mischievous and worthless works.

Accompanying this Report is the large Plan of the city, fourteen sheets of longitudinal sections of streets, two sheets of designs, and general plan. I would respectfully recommend to the Committee, that all care be taken of the large Plan—that it may not be open to every person, as such a course would infallibly insure its destruction—and that tracings be made of it for general use, as soon as possible. As it shews the actual position and description of every street, house and structure in the city up to November 1860, its value as a record is abundantly apparent, and the Council will find it necessary to have the location of every new house or other structure hereafter to be erected, accurately placed in its true position on that plan, as well a matter of Municipal economy as necessary for the execution of such works as may subsequently be undertaken by the city. The table of grades appended, are referred to the sill of the Guard Lock on the Rideau Canal.

In concluding this Report, I would not be doing my duty to my fellow citizens if I did not strongly point out to the Council, the necessity for taking action thereon with the least possible delay. The health, prosperity and future growth of this city must depend in a great measure on the energy, ability and prudence of its leading men; and this is always measured by the extent of public improvements and the facilities for cleanliness and comfort which prudent measures of administration secures. It is not necessary to look to other cities where extravagant speculation in public improvements

has been the rule, but the actual want of those social and commercial facilities afforded by good roads, drainage and water supply is so apparent here, that it does not require any far fetched theory to decide on the extent of improvement, or the amount of population it is meant to accommodate. The circumstances of the city requires this outlay; every month it is delayed adds to its future expensiveness, as well as prevents the property of the citizens from attaining its full value.

All which is nevertheless respectfully submitted.

GEORGE H. PERRY, C. E.



LIST OF STREETS AND GRADES.

| STREET. | FROM. | Height above General Look on Rideau Canal. | TO | Height above General Look on Rideau Canal. | Length. | Inclination. |
|------------------|---------------------|--|---------------------|--|---------|-------------------|
| Metcalf | Sussex | 68.02 | Dalhousie | 68.18 | 1020 | Horizontal. |
| | Dalhousie | 68.18 | Bridge | 59.85 | 993 | 0.73 in 100 feet. |
| Dalhousie | Rideau | 82.57 | York | 81.74 | 645 | do |
| | York | 81.74 | Clarence | 72.34 | 855 | do |
| | Clarence | 72.34 | St. Patrick's | 69.61 | 500 | do |
| | St. Patrick's | 69.61 | McCart | 64.45 | 1100 | do |
| | McCart | 64.45 | McTaggart | 67.74 | 845 | do |
| | McTaggart | 67.74 | Redpath | 69.5 | 313 | do |
| | Redpath | 69.5 | McKay | 65.51 | 500 | do |
| Clarence | Sussex | 88.14 | Dalhousie | 72.39 | 1100 | do |
| | Dalhousie | 72.39 | King | 69.10 | 1100 | do |
| Parr | King Street | 69.10 | Gloucester | 71.55 | 900 | do |
| | Gloucester | 71.55 | Augustin | 79.5 | 1100 | do |
| Wellington | George | 82.50 | Bay | 97.20 | 425 | do |
| | Bay | 97.20 | Sally | 107.37 | 403 | do |
| | Sally | 107.37 | Hugh | 113.37 | 564 | do |
| | Hugh | 113.37 | Bank | 114.70 | 632 | do |

No. 5.

No. 1.

Bideau

| | | | | | |
|-------------------|--------|----------------|--------|-----|-------------------|
| Bank | 114.70 | O'Connor | 122.82 | 526 | 3.63 in 100 feet. |
| O'Connor | 133.82 | Metcalf | 129.25 | 529 | 1.02 do |
| Metcalf | 139.25 | Elgin | 129.00 | 521 | 0.05 do |
| Elgin | 139.00 | Top sed Bridge | 117.84 | 533 | 0.30 do |
| Bridge | 117.8 | Bridge | 117.84 | 561 | Horizontal. |
| bridge | 117.84 | Sussex | 96.38 | 539 | 5.54 in 100 feet. |
| Sussex | 96.3 | Logrove | 85.89 | 417 | 2.48 do |
| Logrove | 85.89 | Hawa | 81.51 | 103 | 0.43 do |
| Hawa | 81.51 | King | 70.15 | 859 | 1.33 do |
| King | 70.15 | Nelson | 80.69 | 699 | 1.71 do |
| Nelson | 80.6 | Gloucester | 88.2 | 439 | 1.91 do |
| Gloucester | 88.2 | hazel | 96.00 | 300 | 1.93 do |
| Chapel | 96.0 | Augusta | 101.5 | 500 | 1.10 do |
| Augusta | 101.5 | Obang | 105.80 | 290 | 1.43 do |
| Obang | 105.80 | Charlotte | 110.63 | 503 | 0.96 do |
| Charlotte | 110.63 | Wurtemburg | 111.71 | 555 | 0.48 do |
| Wurtemburg | 111.71 | Bridge | 74.00 | 505 | 1.16 do |
| Bridge over Canal | 117.8 | Elgin | 127.00 | 435 | 2.33 do |
| Elgin | 127.33 | Metcalf | 131.80 | 439 | 1.96 do |
| Metcalf | 131.80 | Bank | 112.21 | 500 | 0.54 do |
| Bank | 112.21 | Ray | 113.92 | 120 | 0.09 do |
| Ray | 113.92 | Large | 119.56 | 735 | 4.61 do |
| Victoria | 96.03 | Vellington | 117.37 | 400 | 2.84 do |
| Wellington | 107.37 | Queen | 119.00 | 709 | 1.76 do |
| Queen | 119.00 | Maria | 117.20 | 700 | 0.25 do |

Sparks

Sally

LIST OF STREETS AND GRADES.—Continued.

| STREET. | FROM | Height above General Lock on Hibernia Canal. | TO | Height above General Lock on Hibernia Canal. | Length. | Inclination. |
|----------|--------------------|--|----------------|--|---------|-------------------|
| O'Connor | Wellington | 123.82 | Queen | 111.87 | 450 | 4.88 in 100 feet. |
| | Queen | 111.82 | Maria | 112.40 | 877 | do |
| Metcalf | Wellington | 129.25 | Sparks | 111.87 | 20 | 2.54 |
| | Sparks | 121.87 | Queen | 122.50 | 265 | 4.56 |
| | Queen | 122.50 | Maria | 127.40 | 842 | 1.79 |
| Elgin | Wellington | 139.00 | Sparks | 127.00 | 212 | 4.95 |
| | Sparks | 127.00 | Queen | 117.00 | 252 | 3.48 |
| | Queen | 118.00 | Maria | 103.17 | 900 | 1.65 |
| Queen | Sally | 119.00 | O'Connor | 111.00 | 1800 | 0.45 |
| | O'Connor | 111.80 | Metcalf | 122.50 | 505 | 1.89 |
| | Metcalf | 122.50 | Elgin | 118.00 | 740 | 0.57 |
| Maria | Concession B and C | 111.34 | Percy | 120.00 | 400 | 5.33 |
| | Percy | 120.00 | O'Connor | 112.40 | 200 | 0.27 |
| | O'Connor | 112.40 | Canal Bank | 96.78 | 2048 | 0.76 |
| George | Wellington | 82.50 | Sparks | 79.56 | 400 | 0.70 |
| | Sparks | 79.56 | Queen and Duke | 49.57 | 1012 | 2.96 |

No. 11.

No. 2.

14.

Duke Duke and Queen 49.57 Bridge 58.57 930 0.45 in 100 feet.

| | | | | | | |
|--------------|------------------|----------------------------|-------|------|------|----|
| George | Wellington | 82.50 Sparks | 79.56 | 400 | 0.70 | do |
| | Sparks | 79.56 Queen and Duke | 49.57 | 1012 | 2.96 | do |

| Duke | Duke and Queen | 49.57 Bridge | 53.57 | 930 | 0.45 in 100 feet. | |
|------------------|------------------------|---------------------------|--------|------|-------------------|----|
| York | Sussex | 86.99 Dalhousie | 81.76 | 1100 | 0.47 | do |
| | Dalhousie | 81.76 Cumberland | 72.56 | 620 | 1.18 | do |
| | Cumberland | 72.56 King | 69.40 | 406 | 0.74 | do |
| Cumberland | Rideau | 77.25 Clarence | 70.69 | 940 | 0.67 | do |
| | Clarence | 70.69 St. Patrick | 68.67 | 610 | 0.33 | do |
| | St. Patrick | 68.67 Cathcart | 65.61 | 1050 | 0.27 | do |
| Carleton | Cathcart | 65.61 McTaggart | 66.2 | 820 | 0.07 | do |
| | McTaggart | 66.2 Redpath | 70.63 | 645 | 0.67 | do |
| | Redpath | 70.63 Baid | 63.45 | 450 | 2.60 | do |
| St. Paul | Canal Bank | 89.63 Mosgrove | 96.13 | 336 | 1.93 | do |
| | Mosgrove | 96.13 Nicholas | 86.72 | 764 | 1.23 | do |
| Besser | Nicholas | 86.72 Ottawa | 85.68 | 459 | 0.23 | do |
| | Ottawa | 85.68 Cumberland | 85.87 | 300 | 0.06 | do |
| | Cumberland | 85.87 King | 93.00 | 570 | 1.18 | do |
| | King | 93.00 Gloucester | 97.21 | 941 | 0.48 | do |
| | Gloucester | 97.21 End of Street | 111.57 | 2769 | 0.50 | do |
| Day Street | Bank over Rideau | 107.68 King | 107.68 | 3456 | Horizontal | |
| | King | 107.68 Cumberland | 94.40 | 444 | 2.95 in 100 feet. | |
| | Cumberland | 94.40 Ottawa | 94.25 | 300 | 0.04 | do |
| | Ottawa | 94.25 Nicholas | 92.14 | 516 | 0.49 | do |
| Hugh | Rear | 88.42 Wellington | 113.37 | 600 | 4.23 | do |
| | Wellington | 113.37 Sparks | 112.80 | 300 | 0.19 | do |
| | Sparks | 121.80 Queen | 116.50 | 250 | 1.43 | do |

LIST OF STREETS AND GRADES.—Continued.

| STREET. | FROM | Height above Grade of Rideau Canal. | TO | Height above lower sill of Guard Lock on Rideau Canal. | Length. | Inclination. |
|---------------------------|---------------------|---|------------------------|---|---------|-------------------|
| Bank | City Limits | 113.00 Centre | Centre | 114.71 | 127.1 | 0.12 in 100 feet. |
| | Centre Street | 114.71 Maria | Maria | 113.43 | 350 | 0.10 do |
| | Maria | 113.45 Queen | Queen | 114.86 | 838 | 0.04 do |
| | Queen | 113.80 S.arks | S.arks | 112.22 | 322 | 0.18 do |
| | S.arks | 112.22 Wellington | Wellington | 114.50 | 309 | 0.82 do |
| Victoria | Wellington | 114.70 Victoria | Victoria | 114.00 | 24 | 0.23 do |
| | Bank | 114.00 Hill | Hill | 107.30 | 365 | 1.86 do |
| | Hill | 107.30 Hugh | Hugh | 96.1 | 305 | 0.63 do |
| King St. W. of Rideau.... | Mugh | 96.13 Sally | Sally | 96.05 | 690 | 0.01 do |
| | Rideau | 70.15 Daly | Daly | 107.68 | 677 | 5.54 do |
| | Daly | 107.68 Theodore | Theodore | 196.32 | 700 | 0.19 do |
| George | Sussex | 91.80 Dalhousie | Dalhousie | 82.1 | 1194 | 0.56 do |
| | Dalhousie | 82.19 Cumberland | Cumberland | 75.00 | 690 | 1.19 do |
| Theodore | Nicholas | 106.32 Bank over Rideau | Bank over Rideau | 106.32 | 4326 | Horizontal. |
| Nicholas | Rideau | 83.85 Theodore | Theodore | 106.32 | 1430 | 1.57 in 100 feet. |

| | | | | | | |
|-----------------------|---------------------|----------------------------|---------------------|--------------|------|-------------------|
| Gloucester Road | Nicholas | 106.32 Point on road | Point on road | 103.36 | 1374 | 0.14 in 100 feet. |
| | Point on road | 108.36 City Limits | City Limits | 95.52 | 1541 | 0.83 do |

| | | | | | | | |
|----------|----------|--------|------------------|--------|------|-------------------|---|
| Theodore | Nicholas | 106.32 | Bank over Rideau | 106.32 | 4326 | Horizontal. | 2 |
| Nicholas | Rideau | 83.85 | Theodore | 106.32 | 1430 | 1.57 in 100 feet. | |

| | | | | | | | |
|-----------------|---------------|--------|--------------------|--------|------|-------------------|--------|
| Gloucester Road | Nicholas | 106.32 | Point on road | 103.36 | 1374 | 0.14 in 100 feet. | No. 7. |
| | Point on road | 108.36 | City Limits | 95.52 | 1541 | 0.83 do | |
| St. Andrew's | Sussex | 84.24 | Foot of Incline | 69.19 | 400 | 3.76 do | No. 8. |
| | Incline | 69.1 | Dalhousie | 86.86 | 700 | 0.33 do | |
| | Dalhousie | 66.86 | King | 66.86 | 1085 | Horizontal. | |
| Park | King | 66.86 | Rideau River | 66.86 | 2000 | do | |
| Church | Sussex | 87.06 | Dalhousie | 68.32 | 1185 | 1.58 in 100 feet. | No. 7. |
| | Dalhousie | 68.32 | King | 67.23 | 1100 | 0.01 do | |
| King | McTaggart | 65.67 | Rideau | 70.15 | 3531 | 0.12 do | |
| Ottawa | Theodore | 106.20 | Stewart | 102.78 | 690 | 0.37 do | No. 8. |
| | Stewart | 102.7 | Rideau | 80.51 | 780 | 2.85 do | |
| Wilbrod | Ottawa | 103.62 | Timberland | 104.41 | 526 | 0.08 do | |
| | Timberland | 104.4 | King | 106.60 | 461 | 0.31 do | |
| | King | 106.60 | End | 114.46 | 3200 | 0.24 do | |
| Stewart | Rideau River | 114.26 | King | 107.29 | 3209 | 0.25 do | |
| | King | 107.2 | Ottawa | 102.78 | 1083 | 0.88 do | |
| Day | Wellington | 97.29 | Sparks | 113.62 | 276 | 0.05 do | 6. |
| | Sparks | 113.92 | | 122.74 | 599 | 1.56 do | |
| | Point on road | 122.75 | Varia | 113.60 | 600 | 0.79 do | |
| Richmond Road | Broad Street | 74.72 | Albert | 81.21 | 1309 | 0.49 do | |
| | Broad | 74.72 | Fence at Malloch's | 70.54 | 832 | 0.50 do | |

LIST OF STREETS AND GRADES.—Continued.

| STREET. | FROM | TO | Height above Guard Lock on Rideau Canal. | Length. | Inclination. |
|-----------------------|------------------------|------------------|--|---------|-------------------|
| George..... | Pooley's Bridge..... | Hill Street..... | 70.25 | 1000 | 0.87 in 100 feet. |
| Victoria Terrace..... | Hill | Broad..... | 78.97 | 1330 | 0.32 do |
| Nelson | Rideau..... | Besserer | 80.50 | 220 | 6.64 do |
| | Besserer | Daly..... | 95.11 | 300 | 4.22 do |
| | Daly | Stewart | 107.68 | 20 | 0.28 do |
| | Stewart | Wilbrod..... | 108.45 | 310 | 0.18 do |
| | Wilbrod | Theodore..... | 107.86 | 245 | 0.49 do |
| Gloucester | Rideau..... | Besserer | 107.83 | 275 | 3.26 do |
| | Besserer | Daly..... | 88.27 | 400 | 2.60 do |
| | Daly | Stewart | 97.24 | 200 | 0.88 do |
| | Stewart | Wilbrod..... | 107.68 | 200 | 0.14 do |
| | Wilbrod | Theodore..... | 109.03 | 200 | 1.35 do |
| Lloyd | Victoria Terrace | Ottawa..... | 109.03 | 300 | 5.15 do |
| | Ottawa..... | Queen | 51.92 | 160 | 1.85 do |
| | Queen | Duke | 51.88 | 532 | 0.52 do |
| Angusta | Rideau..... | Besserer | 105.01 | 280 | 1.16 do |

| Augusta | Queen | 51.88 Duke | 105.01 Besserer | 101.74 | 280 | 1.16 | do |
|-------------------|-------------------------|--------------------------------|-----------------------|--------|-------------------|------|----|
| Rideau | | | | | | | |
| Augusta | Besserer | 101.74 Daly | 107.68 | 240 | 2.47 in 100 feet. | | |
| | Daly | 107.68 Stewart | 111.06 | 280 | 1.20 | do | |
| | Stewart | 111.06 Wilbrod | 111.14 | 290 | | | |
| | Wilbrod | 111.14 Theodore | 106.32 | 353 | 1.36 | do | |
| Coburg | Theodore | 106.32 Wilbrod | 111.91 | 280 | 2.00 | do | |
| | Wilbrod | 111.91 Stewart | 111.98 | 240 | | | |
| | Stewart | 111.98 Daly | 107.68 | 280 | 1.53 | do | |
| | Daly | 107.68 Besserer | 104.24 | 280 | 1.22 | do | |
| | Besserer | 104.24 Rideau | 106.20 | 297 | 0.66 | do | |
| Queen | Duke | 49.57 Lloyd | 54.88 | 250 | 2.12 | do | |
| | Lloyd | 54.88 Bridge | 57.90 | 150 | 2.13 | do | |
| | Bridge | 57.90 Sherwood | 59.00 | 280 | 0.42 | do | |
| | Sherwood | 59.00 Broad | 57.60 | 370 | 0.37 | do | |
| | Broad | 57.60 Bay | 57.60 | 528 | | | |
| Wartemburg | Rideau | 111.71 End of Street | 106.30 | 1053 | 0.51 | do | |
| | End of Street | 106.30 Ottawa | 67.00 | 650 | 6.00 | do | |
| Sussex | Rideau | 96.38 York | 86.99 | 700 | 1.34 | do | |
| | York | 86.99 St. Patrick | 89.61 | 850 | 0.30 | do | |
| | St. Patrick | 89.61 Near St. Andrew's | 85.68 | 450 | 0.87 | do | |
| | Near St. Andrew's | 85.68 Metcalf and Bolton | 68.32 | 937 | 1.85 | do | |
| St. Patrick | Sussex | 89.61 Foot of Hill | 69.43 | 800 | 2.24 | do | |
| | Foot of Hill | 69.42 King | 68.10 | 1490 | 0.09 | do | |
| Ottawa | King | 68.10 Coburg | 69.00 | 2318 | 0.03 | do | |
| | Coburg | 69.00 Rideau River | 67.00 | 492 | 0.40 | do | |

M

No. 9.

No. 13.



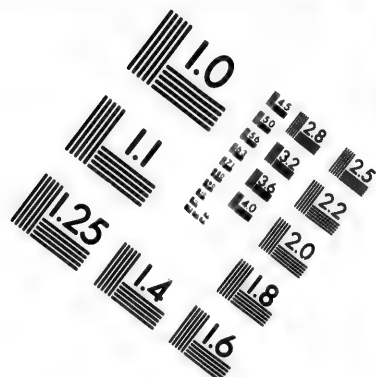
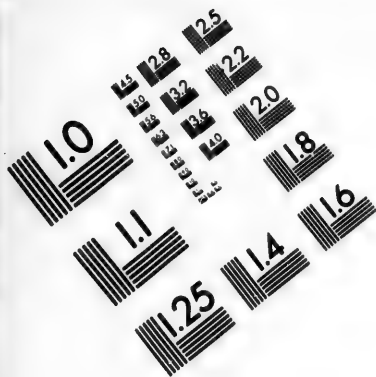
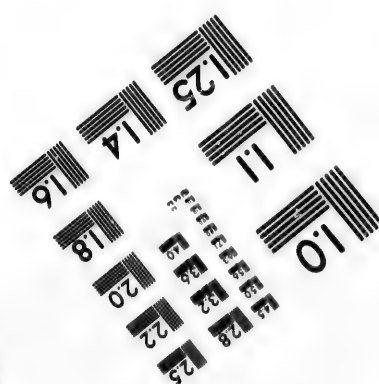
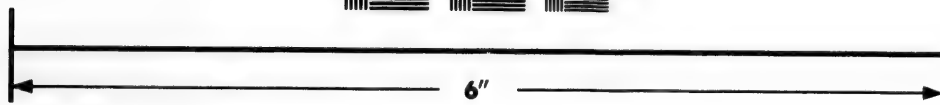
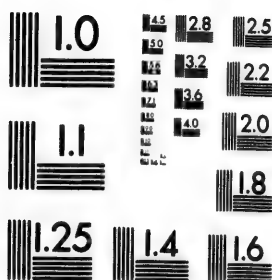


IMAGE EVALUATION TEST TARGET (MT-3)



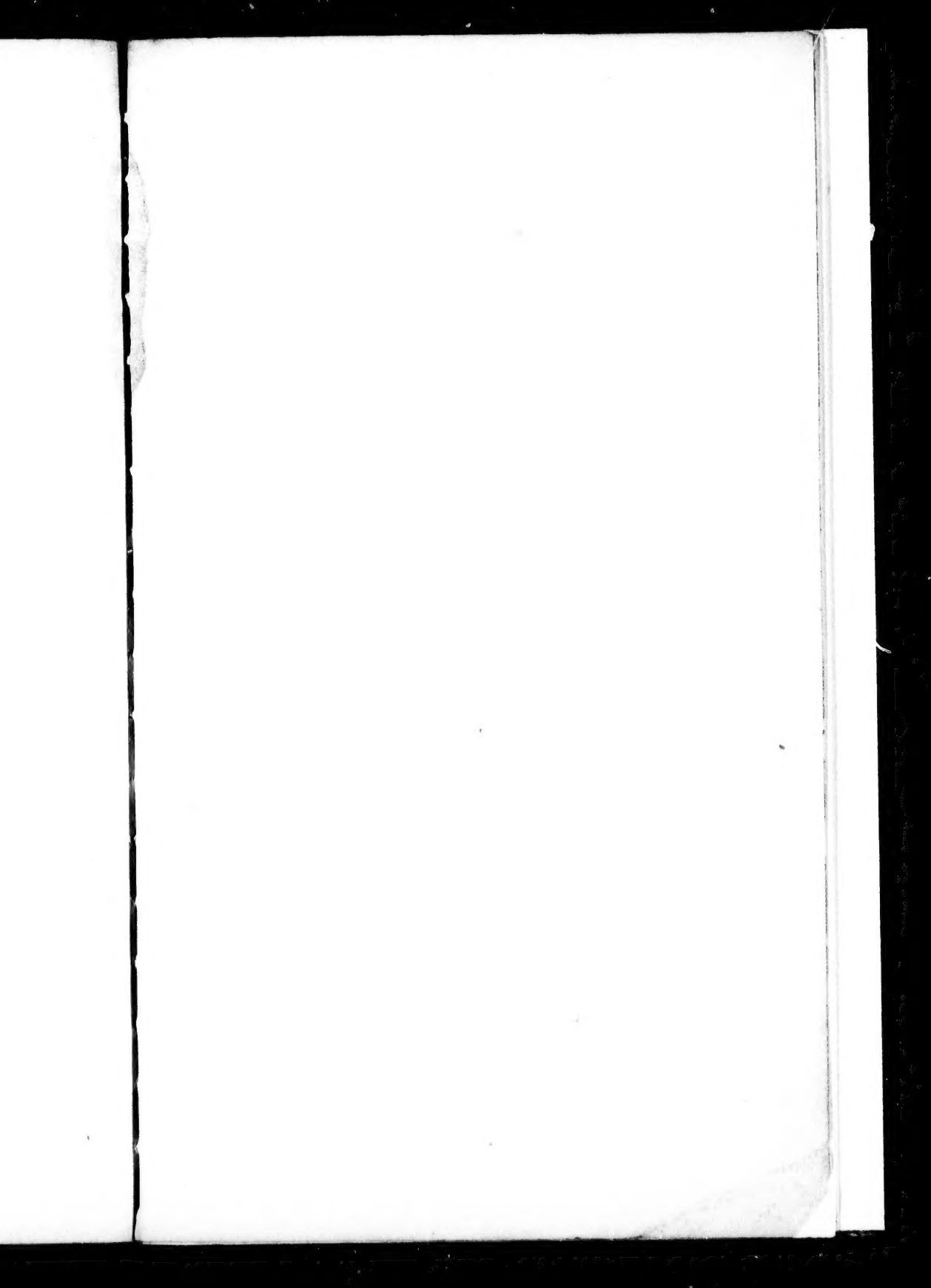
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23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503



LIST OF STREETS AND GRADES.—Continued.

| STREET. | FROM | TO | Height above lower sill of Guard Lock on Rideau Canal. | Height above lower sill of Guard Lock on Rideau Canal. | Length. | Inclination. | No. 12. |
|------------------|--------------------|--------------------|---|---|---------|-------------------|------------|
| | | | | | | | |
| Cathcart | Sussex | Dalhousie | 74.00 | 64.45 | 1200 | 0.79 in 100 feet. | |
| | Dalhousie | King | 64.45 | 63.39 | 1100 | 0.18 do | |
| G'oucester | Rideau | Foot of Hill | 74.43 | 75.61 | 300 | 4.22 do | |
| | Foot of Hill | St. Patrick | 75.61 | 68.08 | 1232 | 0.58 do | |



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